

JOURNAL

OF THE

AMERICAN VETERINARY MEDICAL ASSOCIATION

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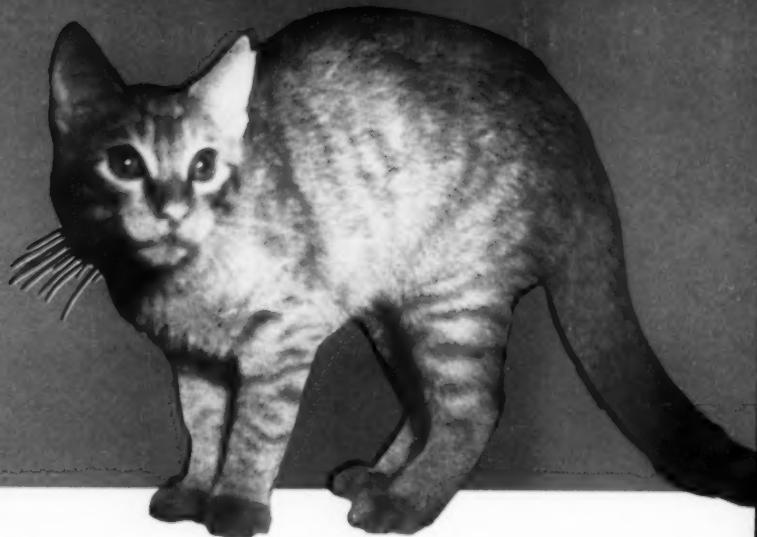
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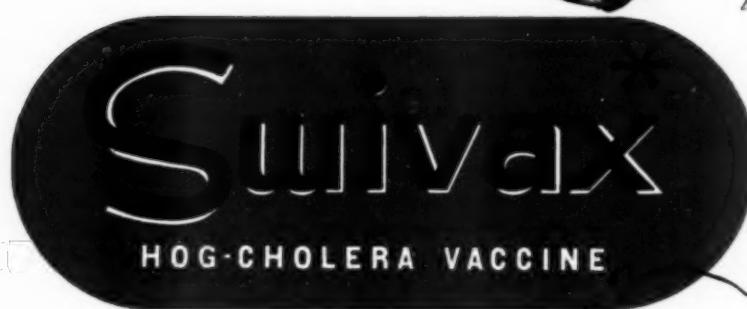
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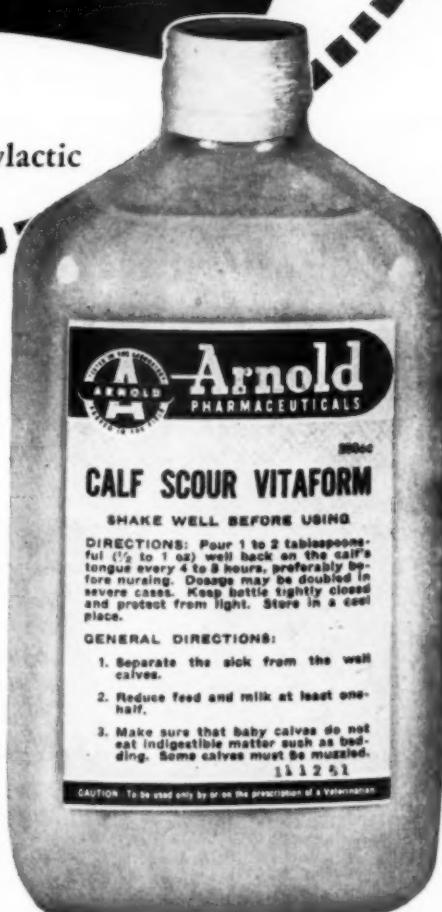
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* Klausman, B. S.: The Use of a New Chemotherapeutic Agent to Arrest Bleeding in Animals, Vet. Med. 46:282, 1951.



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AVMA ★ Report

Veterinary Medical Activities

♦ The Executive Committee of the Audio-Visual Conference for Medical and Allied Sciences met at Association headquarters Feb. 19, 1954. This group was recently established at a meeting held in Chicago by 11 national medical, dental, health, and allied organizations. One of the basic functions of this group is to organize, meet, and act together on those matters concerning audio-visual education in the medical and health sciences. The AVMA is represented on the Executive Committee by Assistant Executive Secretary Kingman.

★ ★ ★

♦ During March, AVMA members serving as legislative contacts to Congressmen in the Eighty-Third Congress, were called on to express the views of the Association regarding pending legislation on social security and the lack of U.S.D.A. appropriations for tuberculosis and brucellosis indemnities.

★ ★ ★

♦ Dr. Pehr Ivar Stenius, Institute of Pathology, Veterinary College, Helsinki, Finland, visited Association headquarters, February 17 to 19.

★ ★ ★

♦ President J. A. McCallam is attending the Second Pan American Congress of Veterinary Medicine, Sao Paulo, Brazil, April 3 to 10, 1954, as the AVMA representative. General McCallam will also visit other places of veterinary interest in South American and Pan American countries.

★ ★ ★

♦ Assistant Executive Secretary Kingman attended the following meetings during March: Second National Conference on Trichinosis, Chicago, March 1; Local Committee on Arrangements, Seattle, March 9; Sixth Annual Chicago Area Career Conference, sponsored by the Chicago Technical Council of the Illinois Institute of Technology, March 20, and the Central States Regulatory Officials and Federal Veterinarians Conference, Chicago, March 29.

★ ★ ★

♦ Program chairmen for the Sections on General Practice, Small Animals, and Surgery and Obstetrics met at Association headquarters in Chicago on March 17 to discuss television presentations for the Seattle meeting. Also attending were Dr. Lester E. Fisher, TV coördinator, Dr. C. F. Clark, advisor to the General Practice Section, Mr. Walter Lawrence of R. C. A., and Mr. John Jewett of Pitman-Moore Company, who are working with the program committee in developing an outstanding TV presentation for Seattle.

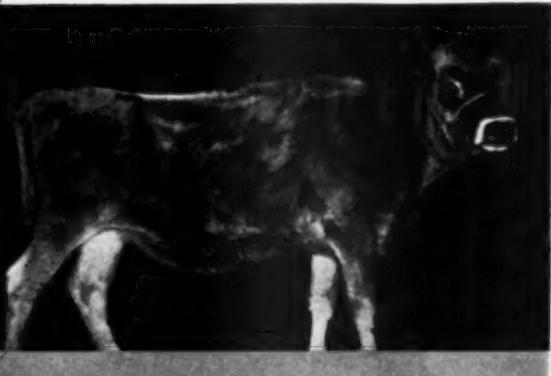
★ ★ ★

♦ Twenty-five officers of the Army and Air Force Veterinary Corps, who attended the Dairy and Meat Hygiene School at the Quartermaster Depot, visited Association headquarters on March 15, 1954. Members of the AVMA staff spoke to the group on the organization and activities of the Association and other professional matters.

★ ★ ★

♦ The booklet, "Plans of Combination Animal Hospitals," (72 pp. with 78 illustrations) is a collection of articles from previous issues of the JOURNAL, and is now available. The price is \$1. This assembling of the articles into booklet form was recommended by the AVMA Special Committee on Standards for Veterinary Hospitals.

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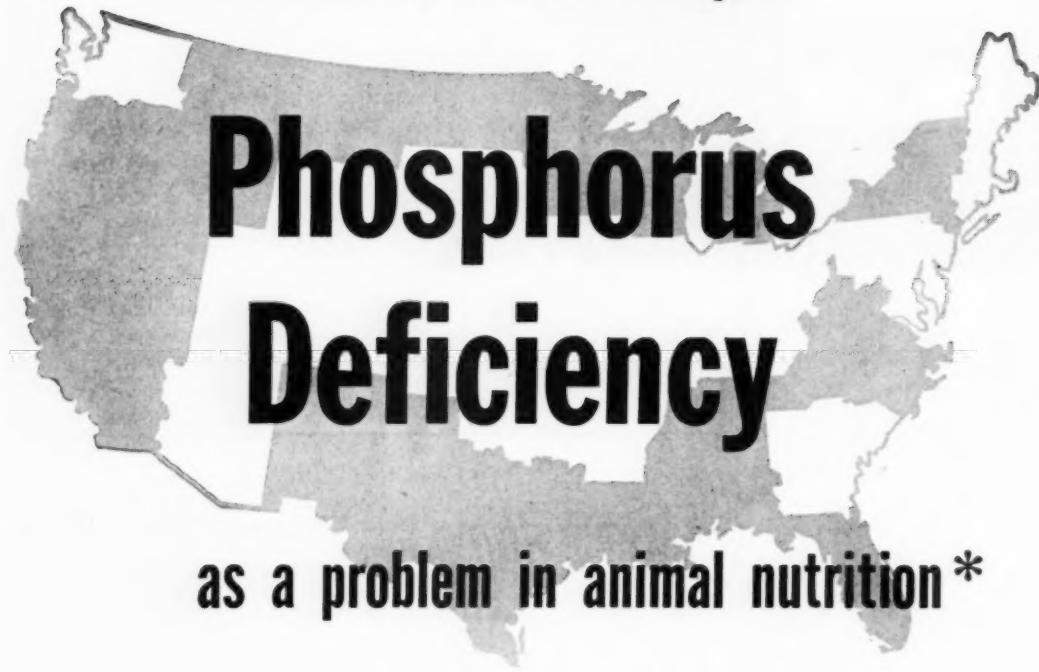
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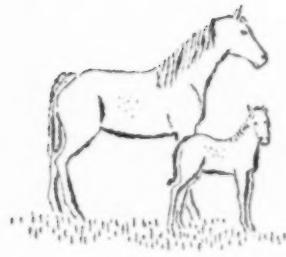
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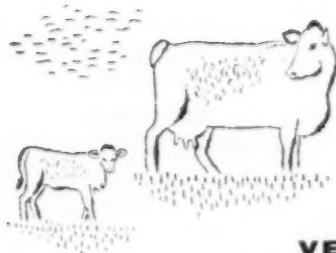
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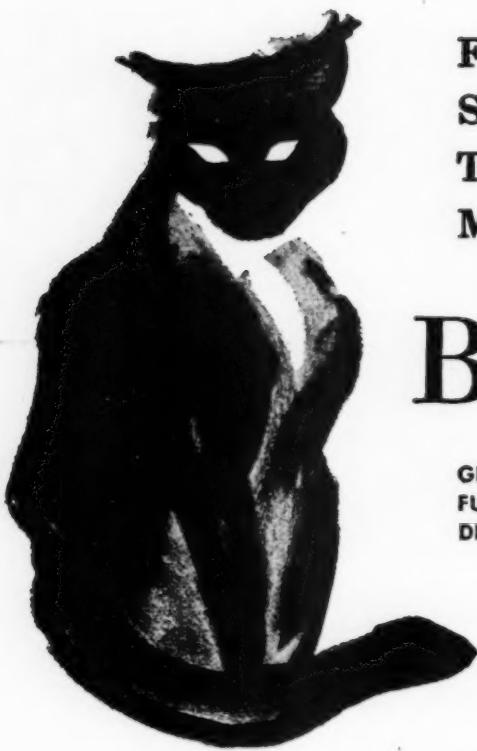
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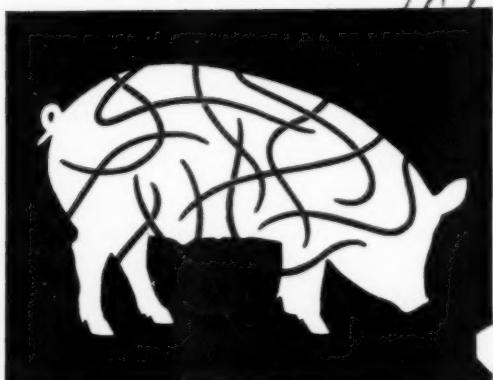
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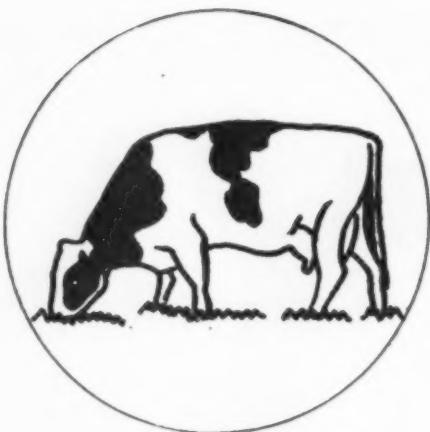
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*Christian, A. B., Segard, C. P.: The Cause and Treatment of Ketosis in Cattle, J.A.V.M.A., 122, (June, 1953): 479-480.

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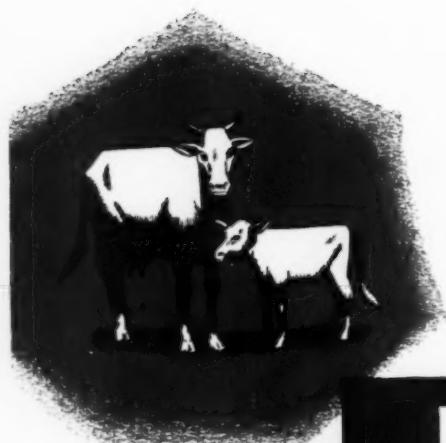


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No. 925

Isolation of the Bluetongue Virus from Texas Sheep— Culicoides Shown to Be a Vector

D. A. PRICE, D.V.M., and W. T. HARDY, D.V.M.

Sonora, Texas

IN A PREVIOUS paper,¹ two epizootics (occurring in 1948 and 1951) of the disease then called "soremuzzle" were described and the possibility of its being bluetongue was suggested. Later, a similar condition was reported in California and specimens sent from that state to the Onderstepoort laboratory in the Union of South Africa resulted in a positive diagnosis of bluetongue.²

During 1952, this disease was diagnosed on only four ranches in Texas. Then, in mid-May of 1953, we investigated what proved to be the beginning of another epizootic. Within the following four-month period, it had extended to many points within the area shown in figure 1.

Since the major portion of the Texas sheep population is restricted to those regions in West Texas known as the Edwards Plateau and the Trans Pecos, it naturally follows that an epizootic involving only sheep would be restricted to this area; but it is of particular interest that the three epizootics had their origins along the Rio Grande River, which constitutes at once the southwestern boundary of the area and the international border. Here, the parallel of latitude is approximately 29 degrees, and much warmer climatic conditions prevail in

early summer than at 32 degrees 30 minutes latitude, the northern extent of the area. Since spread of the disease is believed to depend entirely upon an insect vector which is inactive during the winter months, it is not strange that the outbreaks have begun at the southern extent of the area. All three epizootics began in May or June and terminated during one of the autumn months.

It should be understood that in each year the distribution of bluetongue was undoubtedly greater than that shown in figure 1. We have recorded only the first-hand information which was available to us through field trips, clinical examinations, and personal communications with veterinary practitioners, county agricultural agents, and ranchmen. Hearsay reports would have extended the affected area to many more West Texas counties; and, in at least one year, the area would have extended well into a neighboring state.

ISOLATION AND PROPAGATION OF ONE STRAIN OF THE VIRUS IN TEXAS

During the years 1950 through 1952, blood samples from affected sheep were collected and stored in the oxalate-phenol-glycerine solution reported by Neitz³ to have kept bluetongue virus viable for more than twenty-five years at room temperature. During subsequent attempts to isolate the agent from this preserved blood by means of animal inoculation, the scarcity of susceptible sheep caused many of the blood specimens to be pooled, and it was from one such pooled specimen that a mild form of clinical bluetongue was transmitted to

From the Texas Agricultural Experiment Station, substation No. 14, Sonora, Texas.

Sincere thanks are extended to the following persons for assistance and advice: Dr. R. A. Alexander, Onderstepoort Laboratories, Onderstepoort, Union of South Africa; and Dr. W. W. Wirth, U.S. Department of Agriculture, Agricultural Research Service, Entomology Research Branch, Section of Insect Detection and Identification, Washington, D.C.

The antibiotics for virus procedures were furnished by Merck & Co., Inc., Rahway, N. J.

susceptible sheep. Neitz and Riemerschmid⁴ have demonstrated the intensifying effect of sunlight on the course of this disease and the severity in this case was no doubt influenced by the fact that the sheep were stabled during the entire period. Stabling could not be avoided because the work was done during the summer months and it was therefore necessary to guard against a field outbreak. After a further passage in sheep, the infective agent was passed to embryonating hen eggs where it adapted readily under the conditions to be described.

Fertile hen eggs incubated for six to eight days at 38 C. were inoculated via the yolk sac route with a 10⁻¹ dilution of citrated infective blood in infusion broth, with 0.5 ml. of inoculum being used for each egg. To this and all inoculums mentioned hereafter, streptomycin, 12 mg. per milliliter, was added and an incubation period of at least ten minutes was provided prior to inoculation of the eggs.

Since Alexander⁵ has shown that the bluetongue virus has an optimum growth temperature below that which is normal for hen eggs, inoculated eggs were incubated in duplicate in the only two available incubators, both of forced-draft type. One op-

TABLE I—Protocol to Show Propagation of Sonora Strain of Bluetongue Virus by Serial Passage Through Eggs

Egg generation	Results following inoculation						
	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6	Day 7
1	0/14	0/14	0/14	2/14	4/14	10/14	10/14
2	0/11	2/11	8/11	11/11	.....	.....	.....
3	0/12	0/12	0/12	11/12	12/12	.....	.....
4	1/12	2/12	9/12	10/12	10/12	10/12	10/12
5	0/6	2/6	4/6	4/6	4/6	5/6	5/6
6	0/6	0/6	0/6	1/6	1/6	2/6	3/6
7	0/6	0/6	5/6	5/6	6/6	.....	.....
8	0/6	1/6	4/6	5/6	5/6	5/6	5/6
9	0/6	1/6	5/6	5/6	6/6	.....	.....
10	0/8	6/8	8/8	.....	.....	.....	.....
15	0/11	0/11	8/11	10/11	11/11	.....	.....
20	0/5	2/5	5/5	.....	.....	.....	.....
25	0/11	4/11	7/11	11/11	.....	.....	.....
30	0/5	2/5	4/5	4/5	5/5	.....	.....
35	0/6	5/6	6/6	.....	.....	.....	.....

Note — 10/12, 8/11, etc., means 10 dead, 12 inoculated; 8 dead, 11 inoculated, etc.

erated at 38 C.; the other was set for 33.6 C., but since the work was being done during the summer months, afternoon temperatures in this incubator were known to reach as high as 36.7 C. The agent failed to propagate at 38.0 C., so subsequent work was conducted at the lower, but variable, temperatures, to which the agent became adapted within the first few generations.

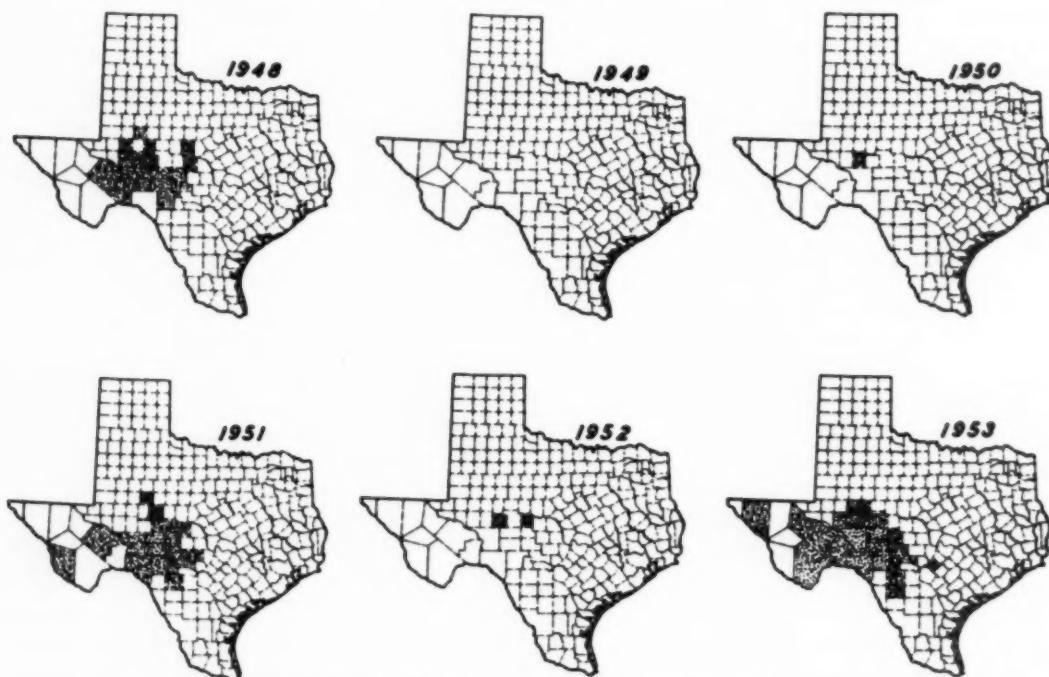


Fig. 1—The incidence of bluetongue in Texas is shown by shaded counties.

The advent of autumn made possible a uniform incubation temperature of 33.6 C. for serial egg passages beyond the twenty-fifth. Routine egg passages were made via the yolk sac route with pooled two- to four-day^{*} dead embryos ground in a Waring blender and diluted 10⁻¹ with broth, 0.5 ml. of inoculum being used per egg.

Intravenous inoculation of susceptible lambs with tenth-passage embryo emulsion elicited on the seventh to ninth days a thermal reaction only (maximum temperature, 106.4 F.). Challenge three weeks later with homologous virus demonstrated immunity. Inoculation of lambs with twenty-first-passage embryo emulsion resulted in a questionable hyperthermia only, with a maximum temperature of 104.9 F. on the sixth and eighth days. Immunity was again demonstrated by challenge with the homologous virus. Susceptible lambs which were inoculated with fortieth-passage embryo emulsion exhibited even less reaction, but developed an immunity that withstood challenge by the homologous virus. (Both of 2 controls inoculated with the challenge material developed pronounced clinical bluetongue and 1 died.) Stabled sheep were used for the foregoing passages. Tentatively, the strain just described is called the "Sonora" strain.

POSSIBILITY OF MULTIPLE STRAINS OR TYPES

When Dr. R. A. Alexander, director of veterinary services for the Union of South Africa, visited this state early in 1953, he examined specimens which had been preserved from the 1951 epizootic and stated the opinion that the three zones of coronitis plainly visible on one of the specimens constituted evidence of the existence of as many strains of bluetongue in Texas. Subsequently, it has been our observation that multiple zones are not uncommon, and occasionally a ranchman will relate that his flock had seemed to recover only to be affected again a week or so later. New strains are being sought within the limitations imposed by the availability of susceptible sheep, equipment, and personnel.

The infective agent was recently isolated from a sheep artificially infected by means of the vector described below and from two field outbreaks of bluetongue approximately 140 miles from our laboratory and 50 miles from one another. At the time of this

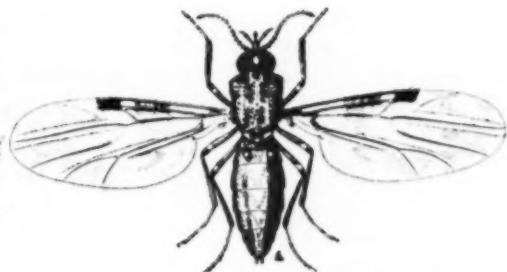


Fig. 2—A specimen of *Culicoides variipennis* (Coquillett).

writing, each has been passaged through several egg generations with considerable difficulty, but since their relationship to the Sonora strain or to one another has not been determined, the matter of their identification and propagation will be reserved for a future report.

SEARCH FOR A VECTOR

It was concluded by Du Toit⁶ that species of the sylvatic *Culicoides* midge are transmitters of bluetongue in South Africa, and no other vector has since been reported.

Acting on this information, the chief of the Animal Disease and Parasite Research Branch requested that the Entomology Research Branch make a taxonomic survey and biological study of this genus in the Southwest. The work is now under way, and the senior author, coöoperating in the survey by operating a New Jersey-type mosquito trap near the Sonora laboratory, has used the trap independently to make catches of *Culicoides* for transmission trials in sheep.

A description of negative trials would serve no purpose, but on one occasion subcutaneous and then intravenous injections into stabled sheep of a broth emulsion of *Culicoides variipennis* females resulted in the production of clinical bluetongue on the seventh day. These specimens were taken from the trap early in the morning, identified and selected under the dissecting microscope, ground finely with ground glass in a mortar, sterile broth added, centrifuged at 3,000 r.p.m. for ten minutes, and the supernatant fluid injected fifteen minutes after the addition of 12 mg. of streptomycin and 10,000 units of penicillin per milliliter of fluid. The inoculum was proved to be bacteriologically sterile.

On another occasion, a similar transmis-

*Embryos which died two to four days after inoculation.

sion trial resulted in a febrile reaction from the seventh to twelfth day (maximum temperature, 105.4 F.), with buccal hyperemia the only lesion noted.

The species of *Culicoides* used in both instances was by far the predominating one at this location at the time the trials were conducted. From a catch made in the same light trap on an intervening night, Wirth⁷ identified a total of 200 *C. variipennis* and only 1 of another species, *Culicoides multipunctatus*. These two instances of transmission are not claimed to be entirely conclusive but are deemed significant in view of the South African work.

SUMMARY

Epizootics of bluetongue in Texas sheep are reported to have occurred during the summers of 1948, 1951, and 1953.

The isolation and propagation of one Texas strain is briefly described. A lower-than-normal incubation temperature has been used for serial egg passages and the agent apparently has become attenuated.

Transmission of clinical bluetongue in sheep was accomplished by the injection of an emulsion of *Culicoides variipennis*.

References

- ¹Hardy, W. T., and Price, D. A.: Soremuzzle of Sheep. J.A.V.M.A., 120, (1952): 23-25.
- ²McKercher, D. G., McGowan, Blaine, Howarth, J. A., and Saito, Joseph: A Preliminary Report on the Isolation and Identification of the Bluetongue Virus from Sheep in California. J.A.V.M.A., 122, (1953): 300-301.
- ³Neitz, W. O.: Immunological Studies on Bluetongue in Sheep. Onderstepoort J. Vet. Sci. and Anim. Indust., 23, (1948): 93-136.
- ⁴Neitz, W. O., and Riemerschmid, Gertrud: The Influence of Solar Radiation on the Course of Bluetongue. Onderstepoort J. Vet. Sci. and Anim. Indust., 20, (1944): 29-56.
- ⁵Alexander, R. A.: The Propagation of Bluetongue Virus in the Developing Chick Embryo with Particular Reference to the Temperature of Incubation. Onderstepoort J. Vet. Sci. and Anim. Indust., 22, (1947): 7-26.
- ⁶Du Toit, R. M.: The Transmission of Bluetongue and Horse-Sickness by Culicoides. Onderstepoort J. Vet. Sci. and Anim. Indust., 19, (1944): 7-16.
- ⁷Wirth, W. W., U. S. National Museum: Personal communication.
- ⁸McGowan, Blaine: An Epidemic Resembling Soremuzzle or Bluetongue in California Sheep. Cornell Vet., 43, (1953): 213-216.

Recent Epizootics

Foot-and-mouth disease (aftosa) was reported on February 26 in carabao on Luzon, P. I.; the type of virus has not been determined. Upon request, the U.S.D.A. assigned Dr. C. U. Duckworth to assist in its control.

Aftosa control in Mexico is proceeding satisfactorily; no new cases have appeared in 1954.

Scrapie in New York (Erie County) was reported on February 15 by the U. S. D. A. This virus neurosis of sheep was eradicated in California and Illinois a year ago but has recently spread to Ohio where control by quarantine is being attempted.

Vesicular exanthema in Arkansas was verified February 12, when authorities were called by an owner who had recognized the symptoms from a telecast of a U.S.D.A. film. Before then, V. E. was confined to California and seven northeastern states. Arkansas is one of the four infected states where cooking of garbage is not required.

Hypodermic Injection Centennial

Dr. Alexander Wood, Edinburgh, was the first to give, in 1853, a subcutaneous injection in the modern sense (*Brit. M. J.*, Nov. 28, 1953). Twenty drops of a solution of muriate of morphia were given to an elderly lady suffering with neuralgia, who could not take opium by mouth. Intravenous injections, however, had been given through a quill since 1657.

1953 Proceedings Book Correction

In the article, "Etiology of Chronic Respiratory Disease" by H. Van Roekel and Olga M. Olesiuk, Department of Veterinary Science, Massachusetts Agricultural College, Amherst, which was presented before the Section on Poultry at the Toronto convention, the usual abbreviation "CRD" for the disease appeared in lower case "crd" (see pages 289-301, 1953 Proceedings Book).

It should be noted that Dr. Van Roekel checked the galley proofs of the article and indicated "crd" should be capitalized in each instance. However, as a measure of economy, the editorial department decided that the expense of resetting about 100 lines of the article was hardly justifiable and so the incorrect "crd" abbreviations were allowed to stand.

This correction notice is printed in fairness to the authors, whose original and correct manuscript was edited for the printer by an inexperienced person. The editorial department greatly regrets the circumstances.

The History of Pseudorabies in the United States

ROBERT P. HANSON, Ph.D.

Madison, Wisconsin

THE HISTORY of a disease before its acceptance as an entity is, with few exceptions, beyond reach of the scientific approach. The exceptions arise from the recognition of signs or ecology of disease which are sufficiently unique to permit tentative diagnosis even from reports written several hundred years earlier. The stories which have been pieced together on rabies and syphilis suggest the fruitfulness of this method of "historical postmortem" to those interested in the evolution of disease.

Accounts of what was probably pseudorabies during the century prior to its recognition are the topic of this paper. Pseudorabies of cattle is a rapidly fatal disease characterized by pruritus. The clinical picture is usually sufficiently unique for diagnosis based on clinical observation alone.

Aujeszky,³ a Hungarian physician and veterinarian living in Budapest, is credited with the first description of pseudorabies which he published in 1902. He demonstrated that a disease occurring naturally in cattle, dogs, and cats was transmissible to rabbits in which it produced characteristic signs which terminated in death. From that year until 1930, some 28 papers on pseudorabies appeared. Aujeszky's disease, infectious bulbar paralysis, or mad itch as the entity was variously called, was reported from numerous places in Europe and Brazil, and its presence was suspected in the United States.

Shope,¹¹ in 1931, established that mad itch occurring in cattle in Iowa was the same as Aujeszky's disease. In a series of papers¹⁵⁻¹⁷ published in the next few years, he showed that a mild and usually unrecognized disease of swine was produced by the agent of mad itch or pseudorabies. The virus was infectious for swine and passed readily through the herd. If cattle were pastured with infected swine, the transmission to cattle occurred through an abrasion in the skin but the virus was not transmitted from cow to cow. During the period 1931 to 1940, interest in pseudorabies increased considerably—199 papers appeared—but in the next decade, 1941 to 1950, investigators apparently turned to other problems and only 60 papers on the subject were published.

In the United States, pseudorabies is known to exist in a large section of the Middlewest. The virus, which has been isolated in Iowa, Illinois, Wisconsin, Missouri, and Minnesota, is probably

more common than the incidence of the overt disease would suggest. An antibody survey¹⁷ made in 1934 revealed that 21 of 23 pools of serum obtained from midwestern establishments producing hog cholera antiserum contained pseudorabies neutralizing antibodies. Failure to recognize pseudorabies in cattle in other sections of the country is not evidence of its absence. The virus was isolated recently in four of the southeastern states—Louisiana, Alabama, Georgia, and Florida.⁹

As Shope stated in 1931, pseudorabies had been present in the United States for an unknown length of time. Usually known as mad itch, it was considered by many to be a form of hemorrhagic septicemia. White,¹⁸ author of a textbook of veterinary medicine published in 1917, considered mad itch synonymous with pseudorabies, but without experimental evidence. The Alabama outbreak, which he cites, an instance of pruritus of horses and mules terminating rapidly in death, if pseudorabies was certainly not typical of the mad itch of earlier or later observers which usually occurred in cattle. A similar account of a fatal disease of mules characterized by pruritus was reported in 1914 by the Florida Board of Health.

Of seven books dealing with livestock disease which were published in America between 1840 and 1900, two refer to mad itch. McIntosh¹⁹ described it as "darrangement of cattle present more some years than others" and said to be caused by eating cornstalks. Cole⁴ in 1847 gave the symptoms as licking and rubbing, with death in ten to twelve hours.

The farm journals of that era have more information. English⁷ reported to the *American Agriculturist* that mad itch, although uncommon in the neighborhood, had destroyed 9 head of cattle in Auglaize County, Ohio, during the last two weeks of September in 1857. He referred to the general belief that it was caused by allowing cattle to eat chewed wads that hogs leave after feeding on green cornstalks but asked, if this were true, why the disease did not kill his neighbor's cattle or any the previous year, since running them with hogs was a universal practice. His description was typical: abrasion of the skin by rubbing that increased in violence as the disease progressed and which was associated with general hyperirritability, twitching, bellowing, finally abrasion of the flesh, exhaustion, and death. The latter usually occurred less than thirty-six hours after the first signs. Hartzell⁹ of Hancock County, Illinois, another reader of the *American Agriculturist*, also took exception to the swine hypothesis. He claimed that the disease could not be carried by feeding cattle with hogs because many of the beef cattle that had been attacked in his area never ran with

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hogs at any time. The majority, however, held with Morgan¹² of Steady Run, Iowa, who had stated in 1853 that he had seen many animals die of mad itch and all had eaten green corn with hogs.

In the columns of the *New England Farmer*¹ in 1844, mad itch was described as a "name given in western states to a disease of cattle commencing with spasmodic jerking of the head and itching." In 1839, the *Cultivator* received queries from subscribers—one living in Illinois and others in Iowa—concerning mad itch. These were the earliest references employing that name.

It was in the *American Farmer*, a weekly journal published in Baltimore, that still earlier accounts of the disease were found. This correspondence was initiated in September, 1823, by the report¹ of a "dreadful malady among cattle" in Talbot, Md. The writer reported, "The animals are seized with a muscular or nervous catching in the head, in one leg, or in the chest. They rub all the hairs off and lacerate the flank and die in twenty-four to thirty-six hours."

Hardeman⁵ of Franklin, Mo., wrote on Dec. 19, 1823, that the disease reported from Maryland was similar, if not the same, as one which had occasionally attacked cattle of Tennessee some eight or ten years earlier. "It was usually denominated by the rubbing distemper because the cattle when attacked would rub their heads and necks against the trees and other firm objects until their horns would sometimes drop off and their eyes be rubbed out of their heads—sometimes the cattle would die before they were carried to such heights by the itching of their skin."

The most complete account of the disease was submitted by Hildreth,¹⁰ a physician of Marietta, Ohio, as transcribed from his notebook.

About the 10th of September, A.D., 1813, Col. Joseph Barker, an intelligent and observing farmer, living near the big Muskingum River, seven miles from Marietta, noticed in one of his cows an unusual propensity for rubbing her nose and the side of the head against every hard substance that came within her reach. He also noticed some slight twitchings in the muscles of her neck, which would draw her head a little to one side; she appeared to eat well, to drink, and was in other respects seemingly in health. In a few hours the inclination to scratch and rub the side of her face and the angle of the lower jaw increased to an alarming degree—the more she rubbed, the more the desire of rubbing appeared to increase. He also noticed a slight swelling along the course of the salivary duct from the parotid gland to where it passes into the mouth. This gland on the opposite side was also swelled, and the swelling spread along the neck and over the side of the head. The hair and scurf skin was in a few hours entirely rubbed off from the side of the head and neck; she appeared to be in the greatest agony and in the course of 12 or 14 hours from the time he first noticed her illness, she expired. For several hours previous to her death, she was unable to stand, but the desire of rubbing herself continued to the last, and the earth was all torn up in a circle round where she lay by her continual efforts in

rubbing. The following day, another of his cows was attacked in a similar manner. He first noticed it by her licking her nostrils with unusual eagerness; this was continued until the blood would follow each stroke of the tongue. The subsequent symptoms were similar to those in the first attacked, and she died in about the same time. After this, one or two fine large steers were attacked and several more cows, who all died in the same manner.

The disorder was not confined to this farm, but attacked several other cattle in the neighborhood. In one instance, the itching commenced on one of the hind legs near the hoof, and in another it began on her udder.

Dr. Hildreth concluded:

So far as I have heard, the disease has in every instance proved fatal. The following year, a few cases appeared in a distant part of the county, but since then, I have no knowledge of its existence in this part of the state. The disease appears to have been in some measure contagious as there is one instance of a dog being attacked, who was known to have eaten of a cow recently dead with the complaint.

The fourth of the communications in the *American Farmer* was signed by SBD¹³ of Paris, Ky., who attested to the uniform mortality of the disease of cattle when it had occurred in Kentucky. (He adds) After investigating every obvious cause, it has been found out to a certainty (I'm creditably informed) that feeding cattle with cut corn with hogs in the same pen or pasture communicates the disease.

The descriptions of the rubbing disorder published over a hundred years ago appear to agree in all respects with those of pseudorabies; the short incubation period, the signs of pruritus, the fatal course, the susceptibility of cattle and dogs, and even the circumstantial evidence for association between swine and cattle as a factor of epizootiological importance.

The disease has reappeared over the years in isolated outbreaks in the United States involving each time only a few animals but generally eliciting considerable local attention and concern. The disease was probably more common than the cited reports indicate as few farmers in any age take the occasion of publishing their troubles and in that period a significant proportion were not sufficiently literate to do so if they desired. The greater apparent incidence of pseudorabies in the pre-Civil War period may well be correlated with the then common practice of unrestricted range of swine, which is now rare. The early epizootic mad itch differed somewhat from the disease of today in its geographical distribution, being prevalent not only in the Middlewest but eastward to the Atlantic coast. The development and improvement of animal husbandry has undoubtedly contributed to the decrease in

importance of pseudorabies of cattle and to the apparent shift in its geographical distribution.

References

- ¹Anon.: To the editor. Am. Farmer, 5, (1823): 245.
- ²Anon: Mad Itch. New England Farmer, 22, (1844): 133.
- ³Aujeszyk, A.: Über eine neue Infektionskrankheit bei Haustieren. Zentralbl. Bakt. Abt. 1, 32, (1902): 353-373.
- ⁴Cole, S. W.: Diseases of Domestic Animals. John P. Jewett and Co., Boston, 1847.
- ⁵Demy, H.: The Mad Itch. The Cultivator, 5, (1839): 182.
- ⁶Eidson, M. E., Kissling, R. E., and Tierkel, E. S.: Pseudorabies Virus Infections in Dogs. J.A.V.M.A., 123, (1953): 24-37.
- ⁷English, J.: Mad Itch in Cattle. Am. Agriculturist, 17, (1858): 10.
- ⁸Hardeman, J.: On the Rubbing Disorder in Cattle. Am. Farmer, 5, (1823): 389.
- ⁹Hartzell: Mad Itch in Cattle. Am. Agriculturist, 17, (1858): 293.
- ¹⁰Hildreth, S. P.: Singular Disease of Cattle in Ohio. Am. Farmer, 5, (1824): 401.
- ¹¹McIntosh, D.: Diseases of Horses and Cattle. M. A. Donohue and Co., Chicago, 1895.
- ¹²Morgan, W. F.: Mad Itch. Wisconsin and Iowa Farmer, 7, (1855): 266.
- ¹³S.B.D.: Diseases of Horses and Cattle. Am. Farmer, 5, (1823): 359.
- ¹⁴Shope, R. E.: An Experimental Study of Mad Itch with Special Reference to Its Relationship to Pseudorabies. J. Exptl. Med., 45, (1931): 233-248.
- ¹⁵Shope, R. E.: Pseudorabies as a Contagious Disease in Swine. Science, 80, (1935): 102-103.
- ¹⁶Shope, R. E.: Experiments on the Epidemiology of Pseudorabies. I. Mode of Transmission of the Disease in Swine and Its Possible Role in Spread to Cattle. J. Exptl. Med., 62, (1935): 85-99.
- ¹⁷Shope, R. E.: Experiments on the Epidemiology of Pseudorabies. II. Prevalence of the Disease Among Middle Western Swine and the Possible Role of Rats in Herd to Herd Infections. J. Exptl. Med., 62, (1935): 101-117.
- ¹⁸White, D. S.: A Textbook of the Principles and Practice of Veterinary Medicine. Lea and Febiger, Philadelphia, 1917.

A New Dog and Cat Census

According to a recent census conducted for the American Can Company, there are now 22.6 million dogs in the United States, more than half of which live in rural areas, and 26.7 million cats, 74 per cent of which are on farms. Six years ago the canine population was estimated at 17 million, which means that dogs have increased at the rate of 900,000 per year.

Families who own dogs have an average

of 1.34 each and families with cats own about 2.21 each. However, some families have both. While the nation has only 41 million families it now has 49.3 million cats and dogs. Canned food is purchased by 78 per cent of the dog owners and 58 per cent of cat owners.

Carbamycin, Another Antibiotic

Following erythromycin, an antibiotic with an activity range resembling penicillin, which was introduced a year ago, comes carbamycin (magnamycin) which is also highly active against many gram-positive bacteria. Its clinical efficacy, however, seems to be less than that of erythromycin.—*Brit. M. J.*, Dec. 26, 1953.

Reporting Diseases

The need for, and the importance of, an established nationwide animal disease reporting system can not be over-emphasized. Such a system would be extremely helpful in detecting the presence and extent of a foreign disease outbreak. . . . Disease prevention and disease control can be much more effective when a disease-reporting system is established and operates on a country-wide basis. It provides the federal and state veterinary practitioner with important information on the location and extent of disease outbreaks within each state and throughout the country.—Committee on Exotic Diseases, U. S. Livestock Sanitary Association Meet., Sept. 23-25, 1953.

Controlling DDT-Resistant Flies

A dry mixture of sugar and phosphate insecticides (malathion, diazinon, and di-alkyl phosphate) applied at the rate of 3.5 oz., five times a week for two or three weeks, on surfaces where flies congregate kills DDT-resistant flies effectively. The cost is less than a single application of good insecticide of spray treatment and the mixture has a relatively low toxicity for livestock.—*Exten. News Service, Reno, Nev.*, Jan., 1954.

Live vaccines have their place but it must be recognized that they do not always act as expected. They may increase the disease complex.—C. A. Brandly, D.V.M., University of Wisconsin, Madison.

SURGERY & OBSTETRICS

AND PROBLEMS OF BREEDING

Abortion in Swine Associated with Leptospirosis

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THIS REPORT describes the investigation made in an attempt to determine the cause of abortions occurring in a group of sows and gilts. *Leptospira pomona* was incriminated in the etiology of the abortions. The significance of this finding is elaborated upon in the discussion section. Very recently, Bryan, Rhoades, and Willigan¹ also reported abortion in swine associated with leptospirosis.

HISTORY AND CLINICAL OBSERVATIONS

During the farrowing season in a group of 29 bred sows and gilts, 16 aborted or delivered a high proportion of dead or weak pigs. Only 7 gave birth to what could be considered normal litters. Two sows farrowed 1 and 3 pigs, respectively. The remaining 4 either were not successfully bred or, more likely, aborted in the pasture unobserved by the herdsman.

Table 1 summarizes the herd record available on these animals. Many of the abortions occurred about two weeks prior to the expected parturition time. In some cases, live pigs were presented, many of which were small and weak and which later died. Some of the pigs at the time of delivery appeared to have been dead for several days or weeks. None of the sows was observed to be sick. The abortions or birth of dead and weak pigs extended over a period of about six weeks.

The only animal introduced on the farm in the past year was one of the boars, purchased in April, which was used to breed these sows. The bred sows and gilts had been pastured in a 5-acre lot and were not in contact with cattle. There was no stream running through this lot.

SEROLOGICAL FINDINGS

Serum samples from 19 sows in this herd, collected at the time when most of them

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had farrowed or aborted, were all serologically negative for brucellosis. All 19 of the samples, however, were serologically positive with *L. pomona* (NIH-I) at a serum dilution of 1:100 or higher. The tube agglutination-lysis test, employing living antigens, was used. Positive reactions were obtained in some of the swine serums diluted 1:12,800. The results of the serological tests suggested the possibility of leptospirosis as the cause of the abortions.

A herd of beef cattle was maintained on this farm, but the cattle had not been in contact with the swine. Of 41 cattle tested, 34 (83%) were serologically positive with *L. pomona*. The herdsman had observed four abortions in these cattle in April.

BACTERIOLOGICAL FINDINGS

Bacteriological investigations were made on 2 pigs which had been delivered by sow 2. This sow farrowed 11 pigs, 7 alive and 4 dead, four days prior to the date when farrowing was expected. Of the 4 dead pigs, 2 appeared to have been dead for several days. Of the 7 live pigs, 2 (A and B) were very weak and were taken to the laboratory, where six hours after birth they were bled from the heart. This blood was inoculated into several tubes of Schüffner's medium. In addition, the blood from pig A was also inoculated into 4-week-old hamsters and young guinea pigs.

Necropsy of these 2 pigs, immediately following the bleeding, revealed numerous petechiae on the kidneys of both. Pig A also revealed numerous petechiae and ecchymoses on the lungs. Dark-field examination of the kidneys and liver of these 2 pigs revealed great numbers of actively motile leptospires from pig A but none were observed from pig B. A kidney suspension from pig A was then inoculated into 4-week-old hamsters.

Portions of the kidneys and liver of both pigs were also placed in 10 per cent formalin. These tissues were later stained by Levaditi's method and then sectioned. Numerous leptospiroses were noted throughout the kidney and liver tissue of pig A (fig. 1), whereas pig B was negative.

Leptospiroses were isolated by cultural methods from pig A but not from pig B. Schüffner's medium which had been inoculated with the blood drawn directly from pig A showed good growth of leptospiroses within a few days. The medium inoculated with the blood of pig B revealed bacterial growth, but no leptospiroses were seen.

Leptospiroses were also isolated from the blood and kidneys of pig A by the use of hamsters and guinea pigs. The hamsters were bled on the fourth day following the inoculation of the pig tissues, and the blood thus obtained was inoculated immediately into tubes of Schüffner's medium. The guinea pigs showed a rise in temperature on the fourth or fifth days at which time they were bled and tubes of Schüffner's medium were inoculated.

The Leptospira isolated was identified by serological methods as *L. pomona*.



Fig. 1—Kidney section of pig A, showing several Leptospira organisms (Levaditi's stain). Approximate magnification, 1,500.

TABLE I—Breeding and Farrowing Records

Sow (No.)	Date bred	Date due	Date farrowed	Days pre- mature	Dead pigs farrowed	Live pigs farrowed	No. pigs died first week	Sur- vived
8	4-29	8-21	8-1	20	9	...	...	...
9	4-23	8-15	8-8	7	11	...	...	...
4	4-22	8-14	8-10	4	10	1	1	...
1	4-30	8-22	8-10	12	12	...	...	...
7	4-23	8-15	8-11	4	6	4	1	3
17	5-9	8-31	8-11	20	11	...	...	...
14	5-8	8-30	8-19	11	9	...	...	...
21	5-21	9-12	8-19	24	13	...	...	...
15	4-28	8-20	8-20	...	...	11	...	11
22	5-21	9-12	8-21	22	12	...	...	...
13	4-29	8-21	8-22	...	1	8	6	2
23	5-17	9-8	8-22	17	11	...	...	...
2	5-9	8-31	8-27	4	4	7	4	3
24	5-19	9-10	8-29	12	10	...	...	...
25	5-17	9-8	8-29	10	10	...	...	...
16	5-7	8-29	8-30	...	7	2	2	—
18	5-5	8-27	8-31	...	...	1	...	1
19	5-11	9-2	9-4	...	1	12	...	12
30	5-15	9-6	9-6	...	2	12	...	12
3	5-18	9-9	9-8	...	9	3	...	3
26	5-18	9-9	9-10	...	3	13	3	10
27	5-18	9-10	9-11	...	...	9	...	9
29	5-19	9-10	9-12	...	10	...	...	...
28	5-20	9-11	9-12	...	...	10	...	10
10	5-31	9-22	9-22	...	...	3	...	3
6	4-30	8-22	...	...	...	...	...	...
11	4-27	8-19	...	...	...	...	...	...
12	5-8	8-30	...	...	...	...	...	...
20	5-1	8-23	...	...	...	...	...	...
Totals					161	96	17	79
29	.....	.....	.....	....	.....	.....	.....	.....

DISCUSSION

In view of the fact that *L. pomona* has been observed to cause abortion in cattle^{2,3} and that swine^{4,5} are very susceptible to infection with this organism, it has been suspected for some time that *L. pomona* might also cause abortion in swine. The observations as described in this report indicate that *L. pomona* is another agent capable of causing abortion in swine.

The finding of great numbers of leptospirosas in the kidneys and liver of a weak pig which had been born only six hours previously appears to be significant. This pig must have been infected *in utero*. The source of the infection was apparently the sow, although no clinical signs of disease were observed.

As viewed by the authors, a probable explanation on the pathogenesis of abortion in swine and also cattle following infection with leptospirosas is as follows: The pregnant sow or cow becomes infected with *L. pomona*, with a leptospiremia resulting. Due possibly to the motility of leptospirosas, these organisms reach the fetuses. Especially in the case of swine,^{4,5} and to a lesser extent in cattle, infection with *L. pomona* may only rarely produce any clinical evidence of disease. However, swine and bovine fetuses would appear to be much more susceptible to the organisms. Abortion may follow death of the fetuses *in utero*.

We would expect the act of abortion to occur several days or even weeks following the onset of infection or symptoms in the dam. In this regard, we have rather consistently observed that cattle aborting due to leptospirosis will usually do so one to three weeks following the first clinical signs of disease, which may be nothing more than a temporary drop in milk production along with a flaccid udder. Another contributing factor would be the inability of antibodies to pass the placental barrier in cattle and swine. However, those pigs which were born alive would, immediately upon nursing the sow, obtain antibodies and thus in a sense be automatically treated by the sow.

There appears to be a marked need for further research on the pathogenesis of leptospiral abortion in domestic animals and, also, for an evaluation of leptospirosis as a cause of abortion in domestic animals.

SUMMARY

1) In a herd of 29 bred sows, only 7 normal litters of pigs were farrowed during the current season. Abortions or the birth of a high proportion of dead or weak pigs were observed in 16 sows. No sickness among the sows was noticed.

2) Of 19 sows tested, all were serologically positive to *L. pomona* while all were serologically negative for brucellosis.

3) Great numbers of leptospirosas were observed from kidney and liver suspensions made from a weak pig which had been born only six hours previously. *Leptospira pomona* was isolated from the blood and kidney of this pig.

4) *Leptospira pomona* was considered the cause of the abortions occurring in this herd of sows.

5) The probable method by which a leptospiral infection may initiate abortions in swine and cattle is discussed.

References

- ¹Bryan, H. W., Rhoades, H. E., and Willigan, D. A.: Isolation of *Leptospira Pomona* from Aborted Swine Fetuses. *Vet. Med.*, 48, (1953): 438.
- ²Mathews, F. P.: A Contagious Disease of Cattle Associated with Leptospira. *Am. J. Vet. Res.*, 7, (1946): 78.
- ³Little, R. B., and Baker, J. A.: Leptospirosis in Cattle. *J.A.V.M.A.*, 116, (1950): 105.
- ⁴Bohl, E. H., and Ferguson, L. C.: Leptospirosis in Domestic Animals. *J.A.V.M.A.*, 121, (1952): 421.
- ⁵Bohl, E. H., Hill, R., Ferguson, L. C., and Helwig, J.: Experimental and Field Observations on Leptospirosis in Swine. A report given at the conference of "Research Workers in Animal Diseases in North America," at Chicago in November, 1952.

Is Leptospirosis a Factor in Abortion in Swine?

Abortion in swine, for many years a baffling problem, was given surprisingly little serious attention by research workers until about ten years ago when a study of swine brucellosis was undertaken.

For probably as many years as modern man's memory reaches, swine abortion has occurred as an isolated herd problem which, since most farrowings formerly came from March to May, seemed to be almost as seasonal as frostbite. Veterinarians were often consulted but, being unable to promise re-

lief, were seldom called to examine or attempt to treat these herds.

Often there were so many reports of herds aborting that the practitioner would become anxious about the pig crop in his community only to find, when the vaccinating season started, that exceptional "good luck" had been the lot of as many breeders as had this "bad luck." The problem so seldom affected neighboring herds or recurred in the same herd that remote factors—moldy feed, too much oil meal, or perhaps the "flu" the sows might have had—were often held responsible.

Experience justified advising the "unlucky" breeder to rebreed the "aborters," after skipping at least one heat period, and to get set for a good crop of early fall pigs. However, when brucellosis was implicated, this indifferent attitude changed and many of the sows and boars involved were blood-tested, often with negative results. Some authorities even ventured the opinion that a virus infection might eventually be found responsible for at least half of the swine abortions in some states.

Now, *Leptospira pomona* infection has been brought into the picture. Since affected swine show few other symptoms and since laboratory tests for *Leptospira* infection were not readily available until about 1950, it is possible that leptospirosis could have been the cause of at least part of these unexplained abortions. However, infected swine are believed to readily infect cattle and since cattle more frequently show symptoms of leptospirosis, it is difficult to explain why such symptoms were not more frequently observed in the two species concurrently. Likewise, if *L. pomona* infection is an etiological factor in periodic ophthalmia, symptoms in the other species could have been expected to occur on the farms where that disease blinded so many horses years ago.

More research on leptospirosis is needed, but perhaps an attempt to accumulate information on the concurrency of diseases which possibly were due to *L. pomona* infection would be as enlightening as would any laboratory findings. To be of value, such an investigation should be undertaken before the already old records become even more moldy.—W. A. A.

A Simple, Reliable Vulvar Suture

The retention suture for prolapse of the vagina, described (p. 139) in Guard's new edition of "Surgical Principles and Techniques," consists of umbilical tape in a 5.5-in. needle inserted 2 in. lateral to the lower commissure, carried upward and deeply in the fibrous tissue to emerge 2 in. lateral to the upper commissure, then downward in a like manner on the opposite side. The doubled tape, which forms a purse string suture, is tied with a bowknot so it may be opened for vaginal inspection or therapy.

In porcine leptospirosis the chief symptom is abortion, usually within two or three weeks of farrowing: the chief loss, in addition to the lost pigs, is from unthriftness of the surviving pigs.—H. L. Marsh, D.V.M., Illinois.

A Tracheotomy with Complications in Surgery

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A well-trained, 10-year-old Standardbred gelding was admitted on July 22, 1953, to the surgical clinic of the New York State Veterinary College for correction of laryngeal hemiplegia. The owner stated the gelding was heavily staked for the remainder of the racing season and desired correction, if possible, without interruption of the racing schedule. Tracheotomy was advised and accepted.

With the animal standing, the operative site (an area 8 cm. wide by 15 cm. long, starting 8 cm. below the thyroid cartilage) was clipped, treated with an antiseptic, and locally infiltrated with 25 cc. of 2 per cent procaine hydrochloride solution. The skin and subcutaneous tissues were incised, the ventral muscles of the neck divided on the midline, and the fascia propria incised. Then, using a No. 10 Bard Parker blade on a No. 3 handle, the tracheal annular ligament was stabbed and the incisions elongated. The tracheal ring anterior to the incision was grasped with an Ochsner forcep, and an elliptical excision of its posterior

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border was started. The blade broke before completion of the excision, with the tip falling into the trachea. The operation was completed with a straight bistoury, and the tracheal tube was placed in position.

Soft tissue radiography then revealed the broken blade lying 19 cm. posterior to the incision site. A small rod magnet, 0.5 cm. by 7.5 cm., was procured and a length of braided silk suture was securely fastened to a groove made near the end of the magnet. A knot, as a marker, was placed in the suture 19 cm. from the tip of the magnet, which was then passed through the tracheotomy tube and down the trachea. However, during the interval of approximately ten minutes between radiography and magnet exploration, the broken blade had apparently moved down the trachea as a result of minor mucosal hemorrhage and secretions. The magnet was lowered gradually and at about 40 cm. the blade tip was engaged and recovered.

The gelding was given 3 million units of procaine penicillin G in aqueous suspension intramuscularly and was discharged with instructions for cleaning the tube. Two months later, the owner reported no complications and successful racing in his committed races.

Conclusion.—An error in judgment, using a light detachable blade for heavy duty, was fortunately corrected without injury to the patient.

An Unusual Chinchilla Pregnancy

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According to an abstract¹ in the September JOURNAL, puberty in the chinchilla is reached at 4 to 6 months of age, the normal gestation period is about 111 days, and the parturition time is about six to eight hours. On most ranches, males and females are kept in the same cage until at least 3 months of age.

On Sept. 5, 1953, a chinchilla, born Feb. 28, 1953, was brought to my office because the owner was suspicious that she was pregnant. He was alarmed at the recent

Dr. Fish is a general practitioner in Perth, Ont.

¹Reproductive Phenomena in the Chinchilla. J.A.V.M.A., 123, (Sept., 1953): 192 (Abstr. from the Speculum, Spring, 1953).

rapid increase in weight and size. Manual palpation indicated that there were 2 fetuses present. The chinchilla had been in a cage with a full sister, 4 other females, and 1 male, all about the same age. She was bright, active, eating well, and her external genitals showed no signs of pending parturition.

She was observed daily and showed no change until the fourth day when she acted a little uneasy, and did not eat well. Her genitals were slightly swollen, and that evening there was a slight grayish, watery discharge. She had also made some attempts at nesting in some hay which was in the cage (no nest box was available). On the fifth day, 1 baby was born about 8:00 a.m. and the second at 11:00 a.m. Both were born without help and appeared normal, as did the female.

On that day, September 10, the female was 195 days old. Allowing 111 days for a normal gestation, the female must have been bred on May 22 when less than 3 months old (83 days). The male was about the same age. At parturition, the female weighed 23 oz., which is about normal for pregnant chinchillas. After parturition, she weighed 18 oz. Her litter mates averaged 14 oz. Puberty in this female and male were reached at a very early age.

It had been decided to do a cesarean section, if dystocia occurred, using ether anesthesia, which the chinchilla tolerates very well. Nembutal may also be used, the normal dose of 1/5 gr./1 lb. of body weight being increased 50 per cent and given intraperitoneally. Manual delivery is difficult and usually is not recommended. It has been tried with success if part of the fetus (usually the head) is out of the pelvis. The fetus is often dead in these cases but with care the prognosis for the female is good. Posterior pituitary extract, 0.125 to 0.063 cc. injected subcutaneously, is effective for uterine inertia.

Chinchilla practice provides an interesting and slightly different aspect to veterinary medicine. It should be welcomed by the veterinarian whenever possible lest it fall into other hands.

Inguinal hernia in man is basically a bilateral disorder. Many with a sound single repair will later develop a hernia on the other side.—Am. J. Surg., Jan., 1954.

Partial Strangulation of Bovine Abomasum

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Fort Collins, Colorado

During the month of October, 1953, in the anatomy laboratory of the School of Veterinary Medicine, Colorado A. & M. College, a 475-lb. Hereford heifer was routinely prepared for dissection. The animal was thin and apparently unthrifty. No attempt at diagnosis was made.

In the usual course of dissection by students, it was discovered that the ventral lobe of the liver lacked development and the pyloric portion of the abomasum was partially strangulated by a large, persistent, round ligament of the liver, the remnant of the umbilical vein (fig. 1, No. 5).

The persistent round ligament was well developed, cordlike, 3 cm. in diameter, and contained a lumen through half its length. It extended directly from the portal fissure to the ventral abdominal wall at the umbilicus.

From the Department of Veterinary Anatomy, Colorado A. & M. College, Fort Collins.

Apparently, during development, the abomasum herniated through the falciform ligament, making possible the subsequent partial abomasal strangulation. Undoubtedly, the partial strangulation was the chief cause of the animal's poor condition.

In addition, the urinary bladder was developed little beyond the fetal stage. It was cylindrical, with the lumen extending as far forward as the umbilicus, to which the anterior extremity of the bladder was attached.

Congenital Absence of Both Kidneys

Agenesis of both kidneys is rare but in one series of 5,000 necropsies on fetuses and newborn infants, its incidence was 0.03 per cent. It is compatible with intra-uterine life and does not appear to affect the quantity of liquor amnii. The average survival after birth was one and one-half hours, although two infants lived eleven and twenty-one days respectively.—*Brit. M. J.*, Jan. 9, 1954.

When a cesarean section seems advisable, procrastination decreases the chance for success.—*S. E. Ferguson, D.V.M., Wisconsin*.

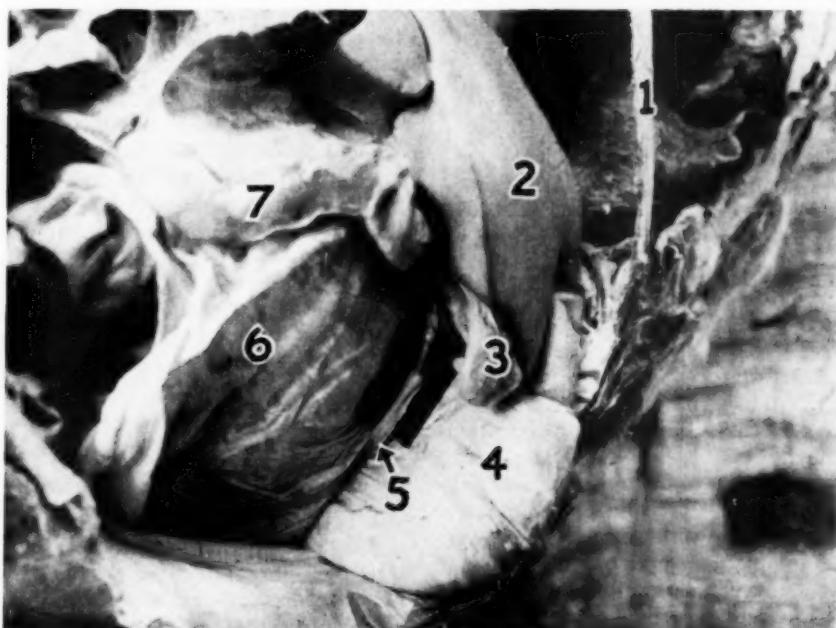


Fig. 1—View of right side of dissected heifer: (1) eighth rib, (2) liver, (3) gall bladder, (4) abomasum, (5) round ligament, remnant of umbilical vein, (6) greater omentum, and (7) duodenum.

The Thoracic Approach in Canine Surgery

J. H. RIPPS, D.V.M.

Asbury Park, New Jersey

Hesitancy about a surgical procedure usually stems from lack of experience, for any of us could do a chest operation, although we may never have opened a thorax. It is lack of experience with chest surgery that induces many to repair a diaphragmatic hernia through the abdomen when it is conceded that the thoracic approach is superior. A few special instruments are needed for such procedures as spreading the rib cage or removing a rib, but the principles of surgery do not vary regardless of the site of operation.

A physical deterrent for many has been the mechanical equipment utilized for maintaining open chest respiration. They shy away from some of the available artificial respiration "contraptions," not because they are unsatisfactory for this purpose, but some of them are cumbersome and require attention during the operation. However, this phase of the problem has been greatly simplified by the Burns demand valve, a gadget so simple in operation that it is difficult for the amateur to believe it does the job. One end is attached to a tank of oxygen, the other to the intratracheal tube. The dog's respiration is taken over automatically and the rhythmic clicking of the valve gives assurance that it is working properly.

Many have found it difficult to pass an intratracheal tube. Describing the best way to pass one is difficult because the best way varies, but for each it is the way he can do it most easily. The epiglottis should be grasped with a long pair of forceps, then the tube is passed, using the index finger on its dorsal surface to guide it through the larynx. This is easily achieved in a completely anesthetized dog. Anesthesia, incidentally, is not a big problem since it can be maintained either through the same intratracheal tube, if the proper equipment is available, or via the intravenous route.

As with many accomplishments, once it is done one marvels at its simplicity and regrets not having tried it sooner. The next

time the opportunity is presented, it should be attempted.

Vibriosis in Idaho Sheep

Vibriosis is estimated to have cost Idaho sheepmen nearly \$1 million in one year. Cattle also have been infected but not to the same extent as sheep; perhaps a different strain of the organism is responsible for the cattle infection. The disease produces abortions, especially during the last month of gestation and in young ewes. Many lambs are born weak. Heavy snows seem to be detrimental since they complicate management and because the ewes eat the snow, contaminated by discharge, instead of drinking water. Ewes do not seem to become carriers and it is doubtful if rams transmit the disease. Various vaccines have been tried with negative results; however, ewes seem to develop resistance so should be retained for future use.—*Idaho Agric. Sci., No. 1, 1954.*

In cases of bovine vaginal prolapse, repositol progesterone has been used with good results.—*S. E. Ferguson, D.V.M., Wisconsin.*

Repair of Ruptured Diaphragms

The surgical repair of ruptured diaphragms in 3 animals (2 pregnant cats and 1 sheep dog) are reported. Symptoms developed gradually in 1 animal, the other 2 cases resulted from accidents. Each was approached through the abdominal wall under ether anesthesia.

In the cats, a midline incision was used, in the dog an incision parallel to, and 2½ inch behind, the last left rib. After replacing the herniated viscera, the diaphragm was repaired with a continued silk suture. However, before the opening was finally closed, air was forced from the thorax by manual compression and a final suture quickly tied. Each made an uneventful recovery.—*Vet. Rec., Jan. 2, 1954.*

There usually is no correlation between the degree of bovine vaginitis and the breeding record. It is not a venereal disease, since heifers as young as 2 months old may be affected.—*J. A. Henderson, D.V.M., Ontario Veterinary College, Guelph.*

Dr. Ripps is a small animal practitioner in Asbury Park, N. J.

Dilatation of the Urethra in a Bull

V. L. THARP, D.V.M., and
W. G. VENZKE, D.V.M., Ph.D.

Columbus, Ohio

On Sept. 29, 1953, a 1-year-old Holstein-Friesian bull was referred to the veterinary clinic of the Ohio State University for a diagnosis of his condition and treatment.

The brief history indicated that the condition had existed for approximately two months. No evidence of injury could be ascertained since the bull was kept with young calves. The owner reported that the bull dribbled urine continuously, that a swelling was present below the anus, and that massage of the swelling would reduce its size but the swelling would recur within a short time.

Physical examination revealed an incontinence of urine and a reducible swelling in the perineal region but no evidence of abnormal bladder distention, urethral pulsation, or subcutaneous swelling in the preputial region. The animal was too small for a conclusive rectal examination. The clinical findings revealed no urethral calculi. The tentative diagnosis was a possible perineal herniation of the bladder, since palpation of the swelling caused urine to dribble excessively from the preputial orifice (fig. 1).

In an attempt to confirm the tentative diagnosis and if necessary make a surgical repair of the hernia, a laparotomy was performed in the left paralumbar region. Examination of the abdominal cavity in the pelvic region revealed no evidence of perineal herniation of the bladder. The incision was closed in the usual manner.

Another incision was then made over the swelling in the perineal region, revealing a marked dilatation of the urethra (fig. 2). The urethra was dilated sufficiently in the area to form a cavity capable of holding 750 cc. of fluid.

The patient was salvaged for food since it was thought unwise to employ such an individual for breeding purposes.

From the veterinary clinic and the Department of Veterinary Medicine of the Ohio State University, Columbus.



—Department of Photography, O.S.U.

Fig. 1—Appearance of perineal swelling at the time the bull was submitted to the veterinary clinic.



—Department of Photography, O.S.U.

Fig. 2—Surgical opening of the perineal swelling, showing the marked dilatation of the urethra.

CLINICAL DATA

Renal Hyperparathyroidism (Rubber Jaw Syndrome) in a Dog

S. W. NIELSEN, V.S., and B. J. McSHERRY, D.V.M.

Guelph, Ontario

THIS DISEASE entity, also known as renal osteodystrophy, can be described briefly as a kidney insufficiency with its subsequent effect on the body, particularly the parathyroid gland and the skeleton. If the condition occurs in young individuals before full growth is reached, it is called renal rickets or renal dwarfism.^{12,13}

The primary lesion responsible for the syndrome can be congenital cystic kidneys, bilateral hydronephrosis, or a long-standing severe nephritis. These lesions will result in uremia and, in certain cases, also in retention of phosphorus. As the renal excretion of phosphorus is intimately associated with the parathyroid hormone, this gland will enlarge in an attempt to overcome the retention of phosphorus. The parathyroid hyperplasia, together with the acidosis which is often associated with the kidney dysfunction, will cause osteomalacia by mobilization of calcium and phosphorus from the skeleton, with formation of soft, rubbery bone. The serum phosphate will appear elevated while the serum calcium remains normal or decreases. Metastatic calcification will be present in different organs—kidney, stomach-wall, and the large arteries.⁴ A review of the current literature^{6,7,9,11,15,17} reveals that chronic nephritis associated with the above changes is not an infrequent occurrence in the dog.

PHYSIOLOGY AND BIOCHEMISTRY OF SERUM CALCIUM AND PHOSPHATE

Normal serum calcium of the dog is approximately 10 mg./100 cc. serum; of this, approximately 5 mg. is ionized and 5 mg. is bound to protein, mostly albumin, and thus is physiologically inactive. Available information indicates that calcium is probably not present in the red blood cells, and it is excreted for the most part by the intestines.

In the adult dog, inorganic phosphate is present at the level of 2 to 4 mg./100 cc. of serum; in

young animals, it is a little higher. Phosphorus is a component of the chief negative ions in the intracellular space and plays an important role in acid-base balance.

Patients with chronic uremia and long-standing calcium ion deficiency tend to retain phosphorus. Frequently, a secondary compensatory hyperplasia of the parathyroid gland occurs with removal of calcium and phosphorus from the bones, leading to osteomalacia. As no phosphorus excretion can now take place via the kidneys, the elimination is done by the intestinal mucosa, probably of the colon.¹³ Here the phosphorus comes in contact with ingested calcium and forms inabsorbable calcium phosphate, thus resulting in serious calcium depletion.^{2,6}

The effects of parathyroideectomy in normal individuals are depression of blood calcium and elevation of phosphorus, due to diminution of urinary excretion of phosphate, and tetany usually results. Excess parathyroid hormone increases the phosphate excretion and the bone mineral tries to restore the blood level. As calcium is bound to phosphorus, this automatically leads to increased plasma calcium. If continuous injections of parathyroid hormone are given to dogs, vomiting, bloody diarrhea, and uneasiness occur, with terminal kidney failure and elevation of urea nitrogen.

Recent knowledge suggests that the parathyroid gland is mainly concerned with phosphate excretion and not, as formerly thought, with the calcium metabolism. The changes in the calcium level seem to be secondary to the changes in phosphate and this is probably due to the close chemical association of the ions and the slower rate of excretion of calcium than of phosphate through the kidneys.

CASE REPORT

Clinical History.—The dog, a 6- or 7-year-old male Chow, was admitted to the clinic at the Ontario Veterinary College for examination and euthanasia. The animal appeared depressed, and showed anorexia, polydipsia, and polyuria. There was a strong odor of ammonia from the mouth. The gums of the upper jaw were symmetrically enlarged and protruded about 2 cm. anteriorly to the front teeth, all of which were loose. The gums were found to be considerably

From the Department of Pathology, Ontario Veterinary College, Guelph, Canada.

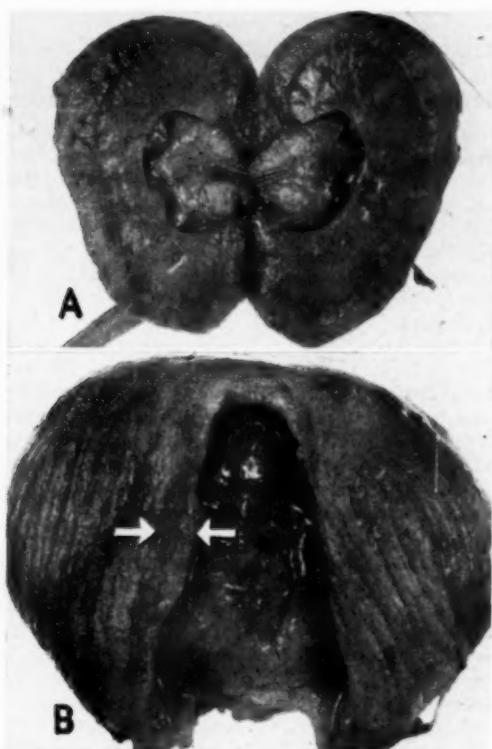


Fig. 1—(A) One of the kidneys opened, showing a chronic interstitial nephritis with marked atrophy and scarring.

(B) Dilatation and hypertrophy of the bladder due to polyuria.

Compare the sizes of the two organs and note the thickness of the bladder wall (arrows).

softened on hard palpation, and they could be easily cut with a knife.

Clinical Pathology.—The clinical pathology was:

Blood urea nitrogen	274.0 mg./100 cc. of blood
Serum calcium	9.0 mg./100 cc. of blood
Serum phosphorus	over 32.6 mg./100 cc. of blood
Serum protein	7.2 Gm./100 cc. of blood
Serum chloride	113.0 mEq.* per liter
H.CO ₃ ion	10.9 mEq. per liter
Red blood cells	3,000,000
Hemoglobin	6.8 Gm.
White blood cells	26,500
Neutrophils	87 per cent
Stabs	2 per cent
Lymphocytes	10 per cent
Monocytes	1 per cent

*mEq. = milliequivalents.

Radiographic Findings.—Demineralization of the skull, most pronounced in the maxillary, premaxillary, and mandibular

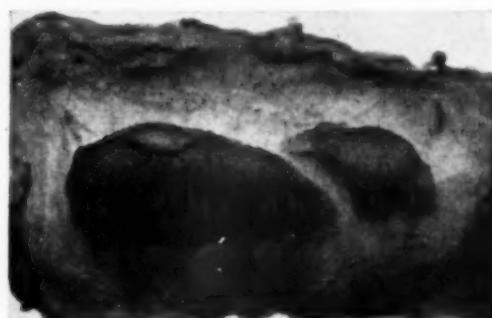


Fig. 2—A piece of trachea with the thyroid and the two hyperplastic parathyroids; the free parathyroid on the right is particularly enlarged.

bones, was present (fig. 4 and 5). The rest of the skeleton appeared normal, radiographically.

Clinical Diagnosis.—There was kidney insufficiency with marked acidosis, phosphorus retention, and renal osteodystrophy of the jaws, the result of a severe chronic interstitial nephritis.

Postmortem Diagnosis.—The postmortem diagnoses were: (1) bilateral chronic interstitial nephritis, with advanced scarring, atrophy, and formation of retention cysts in the cortex; (2) marked hypertrophy and dilatation of the bladder (fig. 1[B]); (3) uremic erosions of the mouth and stomach mucosa; (4) hypertrophic osteitis fibrosa of the maxillary and premaxillary bones; (5) osteoporosis and a pathological fracture of the mandible; (6) bilateral, symmetrical enlargement of the parathyroid glands (fig.



Fig. 3—The septum of the right ventricle, with the three semilunar valves and the rough, cauliflower-like calcification present on the intima of the pulmonary artery.



Fig. 4—A postmortem radiograph of the skull showing an advanced demineralization of the nasal, maxillary, and premaxillary bones. The teeth give the impression of being loose in the alveoli.

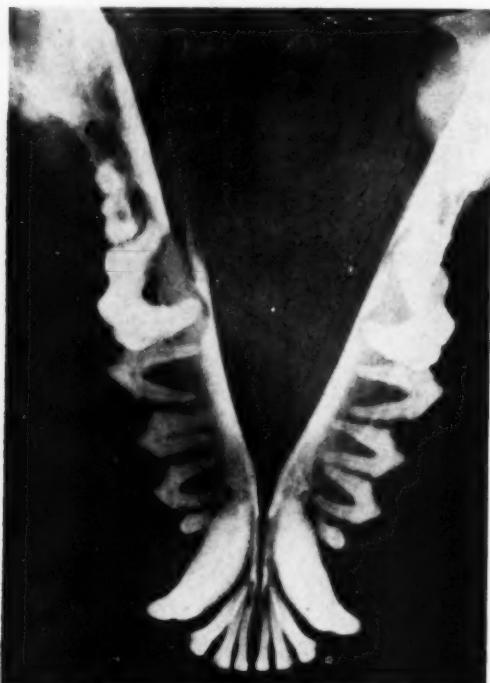


Fig. 5—A postmortem radiograph of the mandible, illustrating some decalcification of the bone and a pathological fracture of the right ramus.

2); (7) focal calcification of the ascending aorta and the pulmonary artery (fig. 3); (8) subacute bronchopneumonia of the left diaphragmatic lobe with one small abscess.

Histopathology.—**Kidneys.**—A chronic interstitial nephritis, with a marked diffuse fibrosis and hyalinization of the renal interstitial tissue, was evident. There was focal lymphocytic and plasma cell infiltration in the cortex, extensive calcification of the peripheral basement membranes of the glomeruli and tubules, and some scattered calcified foci in the interstitium (fig. 6). Scarring and hyalinization of several glomerular tufts were present, with adhesion to the parietal layer of Bowman's capsule, while other glomeruli had a markedly dilated capsular space. Hyaline casts were prominent in both convoluted and straight tubules. The lining epithelium of the collecting tubules and the papillary ducts were hyperplastic and in many tubules a transitional cell epithelium had formed.

Maxilla and Premaxilla.—Here, there was hypertrophic osteitis fibrosa with pronounced osteoporosis. In many areas, there was complete loss of the normal osseous architecture and the cancellated bone was substituted by a young and very vascular fibrous tissue. Scattered necrotic and partly resorbed spicules of bone were seen throughout. Surrounding these were groups of inflammatory cells, mostly giant and polymorphonuclear cells. The giant cells were of the foreign body type with dark nuclei and vacuolated cytoplasm (fig. 7). Great activity was seen in the periosteum, with formation of abundant fibrous tissue containing rows of osteoblasts which formed an immature osteoid tissue.

Parathyroid.—The arrangement of the cells, their size, and the amount of interlobular connective tissue appeared normal (fig. 8). A tumorous development could not be detected in any part. Only one cell type was present, which is the normal histological finding in the dog. This cell, which resembles the chief cell in man, is polyhedral and has a rather light staining, granulated, and slightly vacuolated cytoplasm. The cells are arranged in clusters and cords which measure about two to four cells in width.

Aorta and Pulmonary Artery.—Foci of calcification were present in several areas of the tunica media.

Gastric Wall.—Erosions of the mucosa were found with slight inflammatory reactions, and focal calcium deposits were present in the mucosa and submucosa.

Lungs, Liver, and Spleen.—The left diaphragmatic lobe showed a subacute purulent pneumonia with abscessation. The pus had undergone pronounced calcification. The liver, the remaining portion of the lung, and the spleen exhibited changes related to a chronic, passive congestion.

The thyroid and adrenal glands, pancreas, small intestines, prostate, and myocardium were not remarkable.



Fig. 6—Photomicrograph of the renal cortex showing the extensive calcification present in the parietal basement membrane of the glomeruli and convoluted tubules. Foci of the lymphocytic infiltration are present in the upper right corner and at the bottom. Hematoxylin-eosin, x 100.

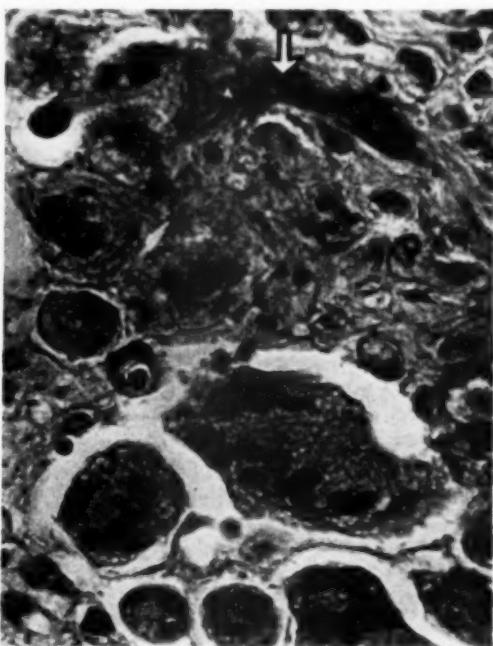


Fig. 7—A section from the premaxillary bone with osteitis fibrosa, illustrating resorption of bone. A dark necrotic bone spicule is seen at the top (arrow) surrounded by osteoclastic giant cells. x 400.

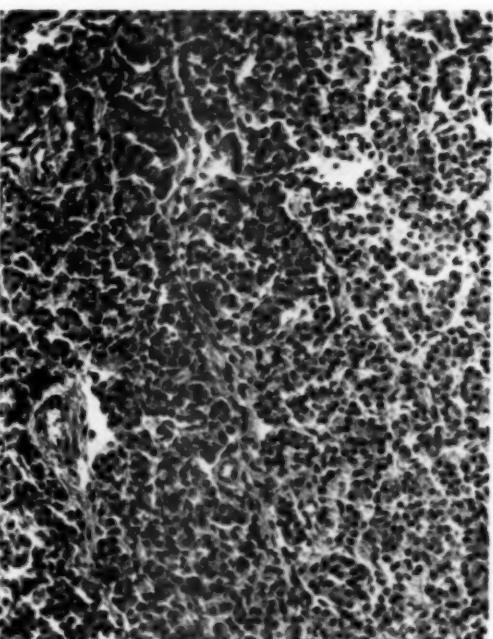


Fig. 8—A representative part of the hyperplastic parathyroid gland depicting the normal arrangement of the chief cell in cords and columns. The amount of interlobular connective tissue is reduced. x 100.

DISCUSSION

That parathyroid hyperplasia is due to a phosphorus retention has been shown experimentally by Drake, Albright, and Castleman.⁸ They used repeated injections of a neutral, isotonic sodium phosphate in rabbits and produced a secondary parathyroid hyperplasia. Pappenheimer and Wilens¹⁶ found a 50 per cent weight increase of the parathyroid gland in 21 patients with nephritis. Castleman and Mallory⁵ reported on the histopathology of the parathyroid hyperplasia encountered in 29 cases of chronic renal insufficiency in man.

In the case reported here, the kidneys showed an advanced, long-standing nephritis, seen as atrophy and scarring of the glomerular and tubular apparatus, with

hyalinization of the interstitial connective tissue. Hyperplasia of the collecting tubules, with formation of a transitional cell epithelium, is a frequent finding in severe, chronic nephritis with polyuria in the dog, and this is presumably due to the increased urine flow. The dilatation and hypertrophy of the bladder were probably attributable to the polyuria, as no obstruction was present in the urethra.

The localized bronchopneumonia was considered a secondary infection, probably due to the lowered resistance of the uremic animal. This infection might be responsible for the raised white cell count of 26,500. Anemia (r.b.c., 3 million, and Hb. 6.8 Gm.) is common in long-standing cases of uremia in dogs. The initial cause of this is not clear, but uremia may depress the activity of bone marrow.

Furthermore, there was evidence of acidosis with an elevated serum chloride value of 113 mEq. per liter (the normal value for the dog is approximately 100) and a lowered $H.CO_3^-$ -ion concentration of 10.9 mEq. per liter (the normal value is approximately 27 for the dog). We can not explain why the demineralization was limited to the jaw bones and was not a generalized process throughout the skeleton.

Secondary or renal hyperparathyroidism must be differentiated from primary hyperparathyroidism, in which an adenomatous growth of the parathyroid is present. As the parathyroid tumor is hormone-producing, elimination of phosphate via the kidneys is increased and serum phosphorus consequently is lowered—from 1.0 to 2.5 per cent in man. Several parathyroid tumors have been described in man^{1-3,10,14,18} and recently 3 cases have been diagnosed in the dog by one of the authors (Nielsen). Bone mineral is mobilized and osteoporosis develops with occurrence of Von Recklinghausen's syndrome. As calcium is excreted more slowly than the serum phosphate, the blood calcium level rises to approximately 30 mg./100 cc. in man, resulting in muscular pains, instability, and weakness, together with osteitis fibrosa cystica, metastatic calcification, and renal calculi.

SUMMARY

This report describes a case of severe, chronic interstitial nephritis in a dog, resulting in uremia, acidosis, and hyperphos-

phatemia. Due to the renal retention of phosphorus, a compensatory hyperplasia of the parathyroid gland occurred, resulting in demineralization with osteodystrophia fibrosa of the jaw bones, and metastatic calcification in various organs.

References

- ¹Anderson, W. A. D.: *Synopsis of Pathology*. 2nd ed. C. V. Mosby Co., St. Louis, Mo., 1946.
- ²Baker, B. M., and Howard, I. E.: Adenoma of Parathyroid with Renal Insufficiency. *Johns Hopkins Hosp. Bull.*, 59, (1936): 251.
- ³Boyd, W.: *A Textbook of Pathology*. 5th ed. Lea and Febiger, Philadelphia, 1950.
- ⁴Brown, C. L., and Ginsbury, I. W.: Osteoporosis Associated with Extensive Metastatic Calcification and Chronic Renal Disease. *Arch. Path.*, 30, (1940): 108.
- ⁵Castleman, B., and Mallory, T. B.: Parathyroid Hyperplasia in Chronic Renal Insufficiency. *Am. J. Path.*, 13, (1937): 553.
- ⁶Coffin, D. L.: *Manual of Veterinary Clinical Pathology*. 3rd ed. Comstock Publishing Co., Ithaca, N.Y., 1953.
- ⁷Davies, G. O.: Osteodystrophia Fibrosa (Osteofibrosis) in Domesticated Animals. *Vet. Rec.*, 48, (1936): 1399.
- ⁸Drake, T. G., Albright, F., and Castleman, B.: Parathyroid Hyperplasia in Rabbits Produced by Parenteral Phosphate Administration. *J. Clin. Invest.*, 16, (1937): 203.
- ⁹Gratzl, E.: Osteorenales Syndrome beim hund. *Wien. tierärztl. Monatschr.*, 28, (1941): 226.
- ¹⁰Harrison, T. R.: *Principles of Internal Medicine*. Blakiston Co., Philadelphia, 1951.
- ¹¹Hogg, A. H.: Osteodystrophic Disease in the Dog with Special Reference to Rubber Jaw. *Vet. Rec.*, 60, (1948): 117.
- ¹²Howard, T. L.: Renal Rickets or Renal Dwarfism. *Am. J. Surg.*, 40, (1938): 323.
- ¹³Mitchell, A. G.: Nephrosclerosis (Chronic Interstitial Nephritis) in Childhood with Special Reference to Renal Rickets. *Am. J. Dis. Child.*, 40, (1930): 345.
- ¹⁴Moore, R. A.: *A Textbook of Pathology*. Saunders Co., Philadelphia, 1952.
- ¹⁵Nieberle, K., and Cohrs, P.: *Lehrbuch der Speziellen Pathologischen Anatomie der Haustiere*. 3rd ed. Gustav Fischer, Jena, Germany, 1949.
- ¹⁶Pappenheimer, A. M., and Wilens, S. L.: Enlargement of Parathyroid Glands in Renal Diseases. *Am. J. Path.*, 11, (1935): 73.
- ¹⁷Platt, A.: Morphological Changes in the Cardiovascular System Associated with Nephritis in Dogs. *J. Path. Bact.*, 64, (1952): 539.
- ¹⁸Willis, R. A.: *Pathology of Tumours*. Butterworth, London, 1948.

Advise the AVMA of a Change in Address

Renal Osteitis Fibrosa Cystica in a Wire-Haired Fox Terrier

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Philadelphia, Pennsylvania

ON JAN. 20, 1953, a 7-year-old male Wire-Haired Fox Terrier was referred to the veterinary hospital at the University of Pennsylvania for diagnosis and treatment.

HISTORY

The owner had had the dog since puppyhood. It had been in good health except for an attack of "lumbosacral arthritis" occasioned by a fourteen-hour exposure in a freezing rainstorm some three years ago.

On Dec. 18, 1952, the dog was placed in a local kennel until January 5. At this time, it had lost weight, was markedly depressed, and a severe polydipsia was observed, the animal drinking 3 to 4 quarts of water daily. Within a few days, severe diarrhea and vomition developed; the dog would vomit solids and liquids shortly after ingestion. He displayed some posterior weakness and would not attempt to jump on furniture as he formerly did. He also had difficulty in breathing through his nose and constantly sneezed and snorted.

On January 14, the animal's condition deteriorated further and he was taken to a local veterinarian who observed a marked swelling of the maxillary regions along with the other systemic manifestations. The condition was diagnosed as either a sinusitis or a sinus tumor. The animal was treated with large doses of penicillin but showed no improvement.

PHYSICAL EXAMINATION

Clinical examination revealed a depressed, emaciated animal. The visible mucous membranes were pale and the breath had an uremic odor. There was marked dehydration. The anal area was soiled with a fetid diarrhea. Examination of the head revealed a somewhat spongy swelling of both maxillary regions. All the teeth, especially the incisors and canines were loose. The mandibles, maxilla, and cranium felt somewhat resilient and lacked their normal rigidity. There were bilateral cystic swellings of the upper gingival areas.

RADIOLOGICAL FINDINGS

Anteroposterior and lateral radiographs of the head revealed the following pathological findings: (1) marked decalcification

of the mandibles, causing the teeth to stand out in striking chalky density in contrast to the rarefied bone; (2) all the teeth were abnormally situated in the alveoli, indicating that there was a marked weakening of the periodontal structures; (3) an increased porosity of the cranial cap was present, giving it a somewhat "moth-eaten" appearance; (4) bilateral, soft tissue enlargements of both maxillary regions.

LABORATORY FINDINGS

Hematological Examination.—The hematological examination revealed the following:

Hb. 4.4	Differential
w.b.c. 22,400	Neutrophil - 100%
r.b.c. 2,110,000	Segment 95%
	Nonsegment 5%

Urinalysis (Significant Findings).—The urinalysis revealed:

Specific gravity	1.013
w.b.c.	30-50/H.P.F.
albumin	++

Biochemical Findings.—The following were the results of the biochemical examination:

Blood nonprotein nitrogen, 290.0 mg./100 cc. of blood (normal 17-35 mg./100 cc.)

Serum calcium, 5.0 mg./100 cc. of blood (normal 9-11 mg./100 cc.)

Serum phosphorus, 26.8 mg./100 cc. of blood (normal 2-4 mg./100 cc.)

In summation of the laboratory data, there was profound anemia, slight leukocytosis and a uremic nephritis, associated with a moderate hypocalcemia and a severe hyperphosphatemia. Correlation of the clinical, radiological, and laboratory findings led to a clinical diagnosis of osteitis fibrosa cystica of renal origin.

The following day, the animal became moribund. A yellowish, watery fluid was constantly emitted from the mouth and anus. The mucous membranes were pallid and felt cold and clammy. In a few hours, the dog died in a terminal convulsive seizure.

Dr. Brodey is instructor in veterinary surgery, School of Veterinary Medicine, University of Pennsylvania, Philadelphia.



Fig. 1—Anterior-posterior view of the head of a normal Wire-Haired Fox Terrier.

NECROPSY FINDINGS

The cranium was very thin and porous. The maxillary swellings consisted of a firm, grayish pink tissue of a somewhat cystic nature which encroached on the nasal passages. The lower jaw was soft and rubbery in texture. Histopathological examination of these bony lesions revealed an osteoclastic resorption of bone and its replacement by fibrous connective tissue in which could be seen abortive attempts at new bone formation. Many multinucleated osteoclastic cells were present in all the sections studied. The maxillary swellings were due to fibroblastic proliferation.

Both kidneys were small, pale, and firm. The capsule stripped with difficulty, leaving a roughened cortical surface. The cortex-to-medulla ratio was 1:1 and grayish white streaking of the cortex was observed. Histological examination revealed chronic interstitial nephritis.

The parathyroid glands were enlarged and, histologically, were markedly hyperplastic. The pathological diagnosis was os-



Fig. 2—Anterior-posterior view of the head of a dog with osteitis fibrosa cystica. The following can be seen: marked decalcification of the jaws and the cranium, causing the teeth to stand out in striking contrast to the rarefied bone; soft tissue swellings in both maxillary regions; severe bone rarefaction of the zygomatic arches and coronoid processes of the mandibles.

teitis fibrosa cystica associated with chronic interstitial nephritis.

DISCUSSION

Renal osteitis fibrosa cystica is an osteodystrophy associated with chronic renal insufficiency. This impaired kidney function causes retention of phosphates in the blood stream and an elevation of the serum phosphorous level (normal level is 2 to 4 mg./100 cc. of blood; in this animal it was 26.8 mg.). Some of these excess phosphates are excreted into the intestinal lumen where they combine with the available calcium, forming calcium phosphate, an insoluble precipitate. This reaction, therefore, causes a decreased calcium absorption from the intestine and thus a hypocalcemia (normal serum calcium level is 9-11 mg./100 cc. of blood; in this animal

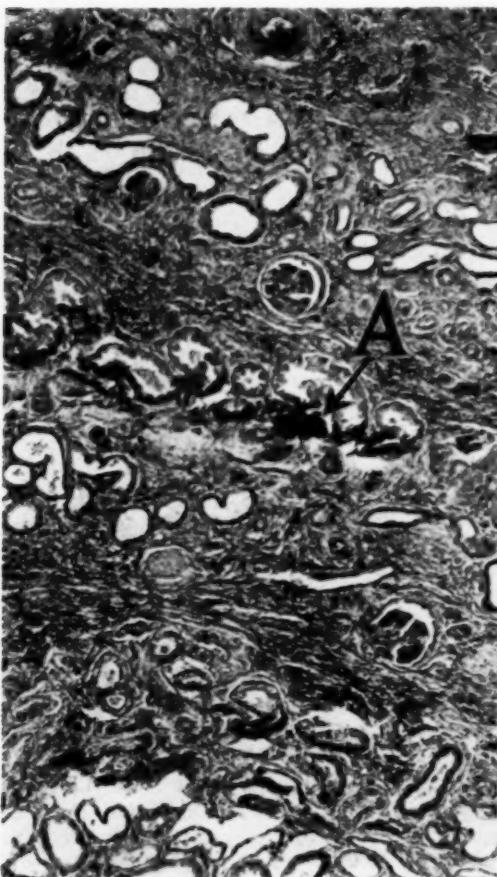


Fig. 3—Renal cortex showing marked interstitial fibrosis with scattered leukocytic infiltrations. Marked distortion and calcification of the renal tubules is present (A) along with alterations in glomerular architecture. $\times 14$.

it was 5 mg.). The parathyroid glands respond to this hypocalcemia by undergoing hyperplasia and thus producing excess parathormone. This causes a demineralization of the bones in an effort to maintain a normal serum calcium level.

In the dog, the clinical signs of bone resorption are confined to the jaws and the head, and thus the term "rubber jaw" is often ascribed to this disease by clinicians. Actually, there is generalized osteoporosis of all the long bones on histopathological examination. Platt¹ states that histological evidence of bone resorption is present in most cases of chronic nephritis in the dog. It is only in a very few such cases that clinical "rubber jaw" is observed.

¹Platt, H.: Chronic Canine Nephritis. *J. Comp. Path. and Therap.*, 61, (1951):140-197.

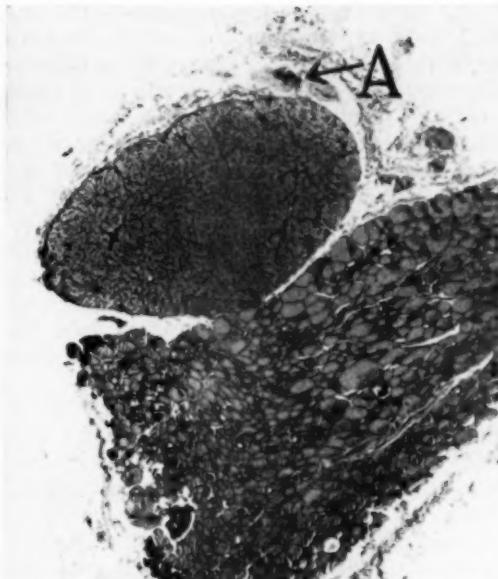


Fig. 4—Parathyroid and thyroid glands, showing marked hyperplasia of the parathyroid gland (A). $\times 3$.

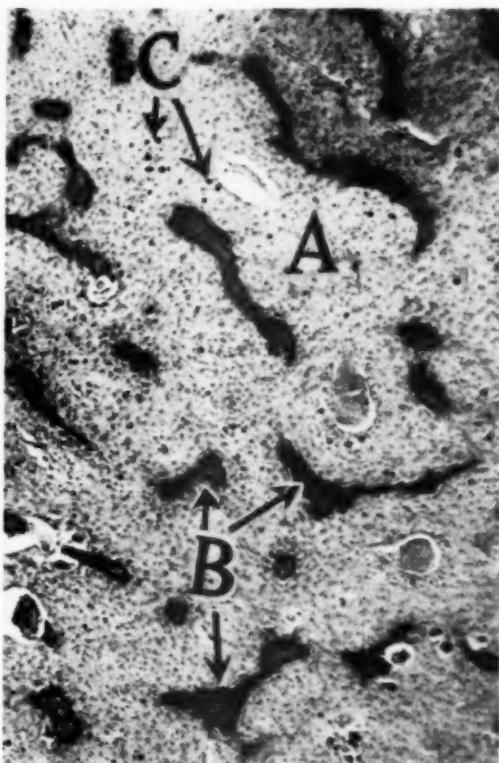


Fig. 5—Mandible showing marked fibrous connective tissue proliferation (A). Many spicules of old and newly formed bone can be seen (B). Many large multinucleated osteoclastic cells are also present (C). $\times 60$.

In reviewing the case history of this dog, it is evident that the severe changes present were brought about by a chronic pathological process. Therefore, it was only the terminal stages which manifested themselves to the owner a few weeks before the death of the animal. The attack of "lumbosacral arthritis" which had occurred three years earlier, following severe exposure, could have represented an attack of acute interstitial nephritis, which then developed into a chronic nephritic condition. This would explain the changes observed in the animal at autopsy.

There is usually no satisfactory treatment for this condition. By the time it is detected, the renal pathology is often irreversible and the animal is moribund. Treatment should be primarily aimed at correcting the existing renal pathology and at supplementing calcium to the animal. The use of an alumina gel orally will bind the phosphates in an insoluble compound and allow the calcium in the intestinal tract to be absorbed.

SUMMARY

A case of osteitis fibrosa cystica of renal origin in a 7-year-old male Wire-Haired Fox Terrier has been described. The important factors in the development of this disease are discussed and are correlated to the disease as seen in the dog.

Staining of Poultry Due to Wooden Crates

JUOZAS VALANTINAS, D.V.M.

Augusta, Maine

It has frequently been observed that dressed poultry, which is packed in fresh ice and placed in cold storage for two to seven days, has developed a gray-blue-violet color. The Pure Food and Drug Act does not allow such stained poultry in interstate commerce and, according to the regulations of the United States Poultry Marketing Administration, it is not considered wholesome for human consumption.

In an effort to eliminate this problem, attempts were made to find the cause of the staining. Several experiments with poultry and with the wooden crates in which the poultry is shipped were conducted as fol-

lows: Parts of dressed, fresh poultry were immersed for three to four hours in solutions of tannic acid in concentrations of 50, 20, 10, and 5 per cent. No marked discoloration was observed except from the caustic action of tannic acid in the strong solutions. When galvanized, crate-binding wire was added to the above solutions, no appreciable discoloration was observed except for a little in the 50 and 20 per cent solutions. When staples which hold the binding wire to the crate box were also added, a blue discoloration was observed in about fifteen minutes in the stronger solutions, and later in all solutions; the time required varying with the strength of the solution.

Next, a 5 per cent solution of ferric chloride ($FeCl_3 \cdot 6H_2O$) was used on the crates and in ten minutes the wood which contained tannic acid showed a black-blue discoloration, while the wood which was free of tannic acid showed no reaction. When the wood showing tannic reaction was put in hot water for a thirty-minute period, the water would become blue after ferric chloride was added.

Conclusions.—Poultry is stored in boxes, made of wood which contains tannic acid and which are bound with iron wire and staples, then are kept in continuous moisture. Discoloration, or staining then occurs as follows: water from the melting ice dissolves the tannic acid from the wood, then is discolored by the iron (ferric oxide) and drips onto and stains the poultry. If the wood contained a normal concentration of tannic acid, or if iron were not present, the poultry would not be discolored.

Recommendation.—Crates for fresh, iced poultry should be made of wood which contains no tannic acid; or if the wood does contain tannic acid, no iron wire or staples should be used in making the crates.

Do Black Cattle Attract Flies?—A southern breeder keeps a few black cattle in his herd of Herefords as fly catchers, because he believes flies prefer black cows. By spraying the blacks with an effective fly poison, he takes care of the fly problem. In Holstein-Friesian cattle, the flies are said to work chiefly on the black spots.—*Exten. News Service, Reno, Nev., Jan., 1954.*

A Dissecting Aneurism in Internal Hemorrhage in Turkeys

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FATAL HEMORRHAGE from the abdominal aorta in turkeys has been observed in Ontario for the past three years. During the past year, the authors have diagnosed the condition in five flocks and have studied one outbreak in detail. A search of the literature failed to reveal an adequate description of the condition. Durrell, Pomeroy, Carr, and Jerstad¹ discussed the problem of internal hemorrhage in turkeys and it would appear that the condition described is similar to that seen in Ontario.

HISTORY

In 1952, a turkey raiser reported that some of his birds were dying suddenly. Most of his losses were in male birds. Postmortem examination showed the abdominal cavity to be filled with blood. He mentioned that a few of his birds had died the previous year under similar conditions and with the same lesion.

In an attempt to avoid further trouble, the owner purchased a flock of 2,500 Broad Breasted Bronze females from a different hatchery for the 1953 season. At 7 weeks of age, the birds began to die as had those the previous year, and by the time the birds were 11 weeks of age, he had lost 150. On gross examination, the owner could easily recognize the birds that died of internal hemorrhage by the bled-out appearance of the head. He confirmed his diagnosis by opening some of the birds and observing the hemorrhage. He also noticed that the affected birds were well fleshed and were, in most cases, above normal weight for their age. In several instances, the owner noticed the birds at the time of death and observed one to be bleeding profusely from the mouth.

More recently, the condition has been observed in a flock of 16-week-old birds. In this instance also, the affected birds were above average weight and this owner stated that feed consumption was above normal.

The 2,500 birds were brooded under all-night lights. A turkey prestarter, 28 per cent protein, was fed for the first six to seven weeks, followed by a 24 per cent starter for another five to six weeks. The turkeys were then put on a 20 per cent grower and were not fed grain until they were 15 or 16 weeks of age. By following this feeding program, which is not generally recommended, these turkeys were much heavier, on the average, than comparable birds in other flocks in the area.

Since the owner of the birds was forcing his

From the Ontario Veterinary College, Guelph, Ont.

flock, he was advised to alter his feeding program. He reduced the protein intake of his next lot of birds by feeding the 28 per cent protein prestarter for ten days only, the 24 per cent protein starter until the birds were 6 weeks of age, and then feeding a 20 per cent growing mash. At 7 weeks of age, the birds were given grain. No losses due to the condition described here had occurred in this group of birds up to the time they were 18 weeks old.

About 50 of the dead birds were examined at the Ontario Veterinary College and approximately the same number were necropsied on the owner's farm. Fresh specimens were difficult to obtain since there were no antemortem symptoms and the dead birds were often unnoticed for some time. In addition, the flock was 120 miles from the College and the delay in bringing them in was appreciable.



Fig. 1—Abdominal cavity opened to show the internal hemorrhage. The liver, spleen, and intestines have been removed.

Bacteriological examination of the birds was negative for significant pathogens. Clotting times were determined on a large number of the flock and were not significantly different from the clotting times of the birds in the College-owned flock, which were considered to be normal. Chemical and bacteriological examination of the farm water supply was negative.

GROSS LESIONS

On opening the abdominal cavity, massive hemorrhage was observed which for the most part was confined to the left side (fig. 1). Careful examination of the birds failed to show any evidence of trauma. The liver, spleen, and intestinal tract were in

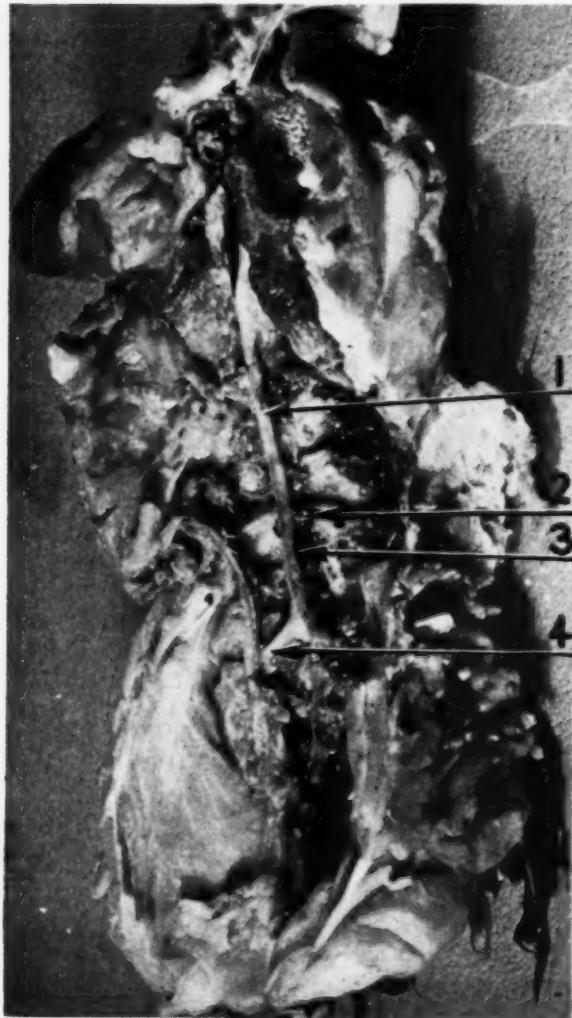


Fig. 2—The blood clot has been removed to show dilatation and rupture of the aorta: (1) aorta; (2) external iliac artery; (3) rupture; (4) sciatic artery.



Fig. 3—Aorta, showing lesion between external iliac and sciatic arteries: (1) aorta; (2) external iliac artery; (3) rupture; (4) sciatic artery.

all cases normal in appearance except for the paleness which would be expected. In several instances, hemorrhage and congestion were present in the lungs, this being the source of blood that was observed coming from the mouth. In the majority of the birds, the lungs were normal.

The clotted blood was intimately involved with the kidneys and, in the birds first examined, removal of this clot resulted in damage to the kidneys and the vessels in the immediate vicinity. To prevent this damage, the rest of the birds were skinned, the breast bone cut away, the liver, spleen, and intestines removed, and the carcass placed in a vat of 10 per cent formalin for twenty-four hours. The clot was then carefully removed, exposing the kidneys. These appeared swollen in many cases but were otherwise normal.

The posterior aorta was exposed from the heart to its terminal bifurcation. In every case, a characteristic lesion was found involving the aorta in the region



Fig. 3A—Aorta, showing typical lesion: (1) external iliac artery; (2) rupture; (3) sciatic artery.

between the external iliac and sciatic arteries (fig. 2). In this area, the clot was adherent and careful dissection was necessary to avoid damaging the vessels. Between these two points, the aorta was dilated and the wall was paper thin, had lost its elasticity, and presented a large tear varying in length from 4 to 14 mm. (fig. 3, 3A). In all but one case, the tear was located on the left side of the vessel.

On opening the lesion in the longitudinal plane, the tunica intima and media were seen to be thrown into deep folds and separated, in places, from the tunica adventitia by clotted blood (fig. 4). Cross sections made at either extremity revealed these changes more clearly (fig. 5). The inner layers of the aorta were separated from the outer by the hemorrhage. In some instances,

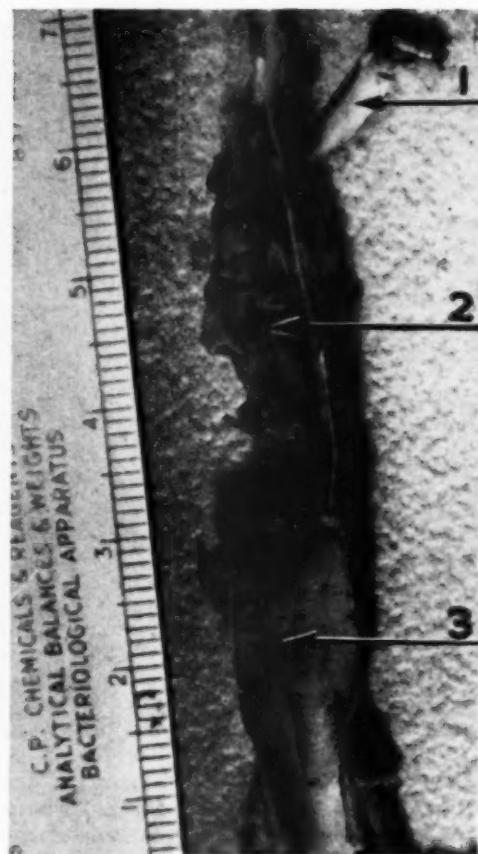


Fig. 4—Aorta opened in longitudinal plane: (1) sciatic artery; (2) aneurism; (3) normal aorta.

the hemorrhage almost entirely separated the vessel wall, forming a tube within a tube. In all cases, the result was a narrowing of the lumen.

MICROSCOPIC LESIONS

Histological sections were cut at varying intervals throughout the length of the lesions and stained with hematoxylin and eosin.

At the anterior portion of the lesion, it was noted that a hemorrhage had dissected the tunica media in the area of the external elastic lamina. This division extended about one quarter of the way around the aorta (fig. 6, 6A). In the middle of the lesion, the dissected area completely encircled the inner layer of the vessel. At the anterior portion of the lesion, the fibers of the media in the area of dissection showed mild degenerative changes and there was some infiltration of heterophils. The tunica adventitia appeared undamaged.

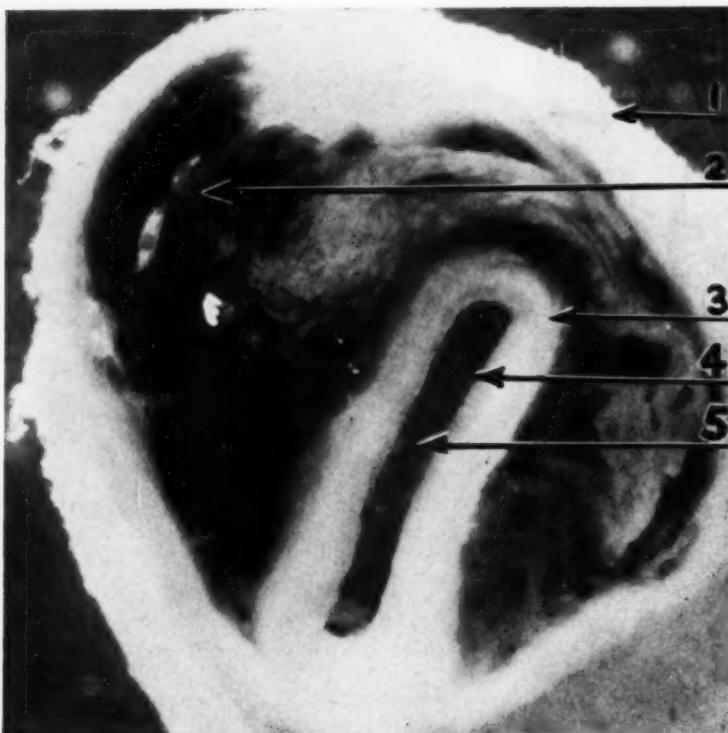


Fig. 5—Cross section of aorta (greatly enlarged) showing tunica media and tunica intima almost completely dissected from the tunica adventitia: (1) tunica adventitia; (2) hemorrhage; (3) tunica media; (4) tunica intima; (5) lumen.

Progressing caudally, the fibers of the tunica media in the hemorrhagic area showed evidence of more severe damage and some necrosis. Heterophils were more numerous and large numbers of macrophages, some with ingested blood pigment, were present. Degenerative changes in the adventitia became more apparent and areas of erosion and cell infiltration were marked.

The tunica intima appeared normal throughout the areas sectioned. In several instances, small round calcareous deposits were present immediately beneath the endothelium. Satisfactory sections could not be made in the area of rupture and, therefore, it was not possible to demonstrate that the tunica intima was ruptured in this region. The large volume of blood in the abdominal cavity and the suddenness of death would suggest a final rupture involving all coats of the vessel.

DISCUSSION

It is apparent that this lesion is a dissecting aneurism, a rather rare finding in animals. In human beings, it is usually found only in adults.² These cases, therefore, seem the more remarkable since the majority of the affected birds were about 11

weeks old. The etiology of the aneurism is not known. It is, perhaps, significant that the cases examined were from flocks in which weight gains were above normal and that the heaviest birds were affected.

CONCLUSION

A dissecting aneurism affecting the posterior aorta of turkeys is described. Treat-

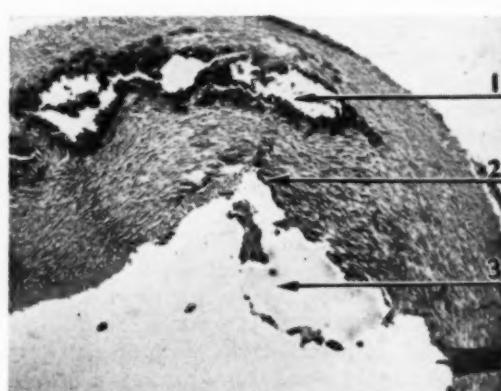
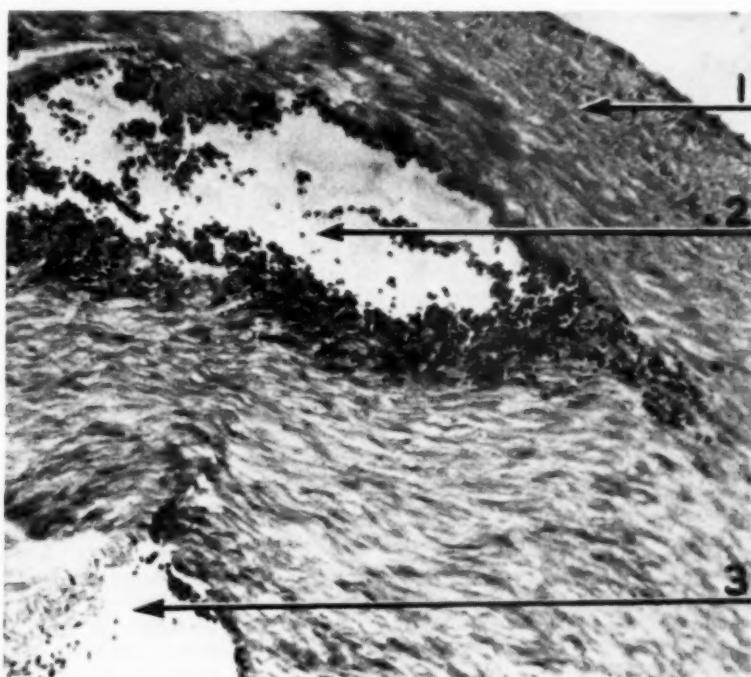


Fig. 6—Photomicrograph of aorta, showing how hemorrhage has dissected the tunica media in the area of the external elastic lamina: (1) aneurism; (2) tunica intima; (3) lumen. $\times 150$.

Fig. 6A—Photomicrograph of aorta (fig. 6): (1) tunica adventitia; (2) aneurism; (3) lumen. $\times 450$.



ment of this condition is impractical but losses did not occur in the second group of birds where there was a slower rate of growth.

References

¹Durrell, W. B., Pomeroy, B. S., Carr, W. S. and Jerstad, A. C.: Discussion. Proceedings Book, AVMA, (1952): 280.

²Boyd, W.: Textbook of Pathology. 5th ed. Lea and Febiger, Philadelphia, (1947): 412.

Aortic Rupture in Pigs of One Litter

On May 13, 1944, 1 of a litter of 50-lb. pigs of the Chester White type pushed into the feed trough, then immediately squealed, staggered backward, and fell dead. The same thing had occurred to a litter mate the evening before. When autopsied, both revealed a pericardial sac distended with hemorrhage and a rupture near the base of the aorta. Eventually, 4 of the litter of 6 died in the same manner. They were a thrifty, pampered litter which had been given to the owner by a neighbor who did not want the late winter litter. They had been kept in the cow barn about a month and were fed well, including as much skim-milk as they could drink twice a day. Apparently, the excitement and exertion at feeding time caused the rupture.—W.A.A.

The Chelation of Metallic Poisons

The word "chelation" (from "claw"), indicating the ability of certain chemicals to form bonds with metallic ions, is new to medicine. The best known chelate is ethylenediaminetetraacetic acid which will combine with lead and carry it from the body. Citric, malic, lactic, and tartaric acids are also natural chelating agents. Chelation is used industrially in softening water (by removing calcium). How much metal can be removed from the bones of a living animal is not yet known but experiments are encouraging. Chelation may be useful also in arsenic and mercury poisoning.—*Brit. M. J.*, Dec. 19, 1953.

[For the use of chelation in veterinary medicine, see the JOURNAL (Nov., 1953: 383 and Dec., 1953: 528). The term in its medical sense is yet too new for medical dictionaries.—ED.]

Six microorganisms have been incriminated as possible etiological agents in atrophic rhinitis: a virus, a trichomonad, a Pasteurella organism, *Spheronophorus necrophorus*, a *Coccobacillus* organism and, in Sweden, the *Hemophilus suis*.—T. L. Jones, D.V.M., Ontario Veterinary College, Guelph.

Comparison of Intramuscular Repository Procaine Penicillin with Oral Penicillin and Probenecid

H. F. RUSSO, B.S.; C. E. E. BUNN, D.V.M.; A. K. MILLER, Ph.D.;
S. F. SCHEIDY, V.M.D.

West Point, Pennsylvania

EVEN THOUGH continued research and development are creating newer chemotherapeutic compounds and antibiotic agents, admittedly it must be said that penicillin, as an agent for the treatment of many infectious diseases, has become not only a permanent part of the veterinarian's armamentarium but is still the agent of choice. For example, it is the best drug for the treatment of infections caused by gram-positive organisms, hemolytic streptococci, staphylococci, and nonhemolytic streptococci. Penicillin can be administered by topical, intramuscular, or oral routes.

Some veterinarians do not consider the oral administration of penicillin in the treatment of infectious diseases to be satisfactory. In human patients, the use of penicillin orally has been subjected to intensive study.¹⁻⁷ The results of these studies have shown that the oral route is satisfactory for the treatment of many infections sensitive to penicillin, provided only that the doses used are large enough to establish and maintain a high "penicillemia."⁸ Hence, it is probable that the hesitancy many veterinarians have about prescribing penicillin *per os* stems from the earlier observations that small doses of the agent, given orally, resulted in unpredictable blood levels because of poor absorption, destruction by gastric acidity, and inactivation by bacterial penicillinase.

That penicillin is absorbed from the gastrointestinal tract was demonstrated by Abraham and his associates.⁹ Small doses of the sodium salt of penicillin G were injected, via a small fistula, directly into the duodenum of both cats and rabbits. The correlation of absorption and excretion was made. Even though no concentration in the plasma was detected in the blood stream in the rabbit, using the same dose, there was in the cat the immediate appearance of penicillin in both the urine and blood. This significant concentration of penicillin in the blood stream was maintained for approximately one and one half hours.

Destruction of penicillin by the acidity of the gastric juices in the stomach has been reported.¹⁰⁻¹¹ This apparent ability of the acid to destroy penicillin led to the use of buffering agents such as sodium bicarbonate, calcium carbonate, magnesium

hydroxide, aluminum hydroxide, and the like. It was believed that these compounds, by neutralizing the acid in the stomach, would permit more complete absorption into the blood stream of the antibiotic agent. The studies by Boger *et al.*¹² and Welch¹³ seems to indicate that large amounts of anti-acids or buffering agents have "little or no influence upon the amount of penicillin absorbed."¹²

In 1940, Abraham and Chain¹⁴ reported that they had been successful in isolating a substance from bacteria that had the property of inhibiting the antibacterial action of penicillin. This enzyme-like substance, named penicillinase by them, has since been found to be liberated by other bacteria, notably by *Staphylococcus aureus* and by coliform organisms of the lower digestive tract.

Though it must be acknowledged that the amount of orally administered penicillin absorbed from the gastrointestinal tract varies inexplicably from patient to patient, it has been shown that the average absorption in human patients is 10 to 30 per cent.¹⁵⁻¹⁶ Russo *et al.*¹⁷ and Davidson *et al.*¹⁸ demonstrated in dogs that, although there is variability between individual animals in their ability to absorb penicillin administered orally, there is in these animals therapeutically significant penicillemia that usually persists for three to four hours.

It is the purpose of this study: (1) to determine the penicillemia of a series of dogs following the oral and intramuscular administration of penicillin; (2) to determine what effect benemid®¹⁹ might have in increasing the penicillemia of these animals and whether benemid would retard the rate of elimination of penicillin through the kidneys; (3) to suggest a convenient oral dosage schedule that might be used for maintaining an effective penicillemia with a combination of penicillin and benemid.

METHODS

A total of 9 trained, unanesthetized, female dogs in good health, ranging in weight from 12 to 20 kg. (6 were 12 kg. and 3 were 20 kg.) were used in this series of experiments.

Blood samples were drawn aseptically from the femoral vein into syringes containing heparin at one half-, one-, two-, three-, four-, and eight-hour intervals after administration of the drugs.

The blood plasma samples were assayed for penicillin by the *Sarcina lutea* cup plate method.²⁰

¹From the Medical and Research Divisions, Sharp & Dohme, division of Merck & Co., Inc., Philadelphia, Pa.

²Penicillemia is a synonym coined by Boger *et al.*⁸ for the phrase "penicillin plasma concentrations."

³Benemid is Merck & Co., Inc.'s trademark for probenecid p-(di-n-propylsulfamyl)-benzoic acid.

Graph 1 illustrates both the average and individual concentrations of penicillin in the plasma of the same 3 female dogs (3-month interval between experiments) following the oral administration of 100,000 units of procaine penicillin G, 0.25 Gm. of benemid, 100,000 units of crystalline procaine penicillin G intramuscularly, and the oral ingestion of 0.25 Gm. of benemid. The penicillemia in both types of experiments was in excess of 0.08 units per milliliter at the expiration of four hours.

Graph 2 shows the concentration of penicillin in the plasma of 3 dogs following the oral administration of 1 remanden® tablet (100,000 units of potassium penicillin G and 0.25 Gm. of benemid) every eight hours for four doses. The clinical implication of the experiment is that, following oral administration, benemid rapidly enhances the penicillemia to high and sustained levels.

Individual comparisons are represented in graph 3. Each dog received, intramuscularly, 300,000 units of crystalline procaine penicillin G in an aqueous suspension as a single dose. The average concentration of the antibiotic agent in the plasma two hours after the injection was 3.38 units per milliliter, and 0.03 unit per milliliter of plasma still was present thirty-eight hours after the initial injection.

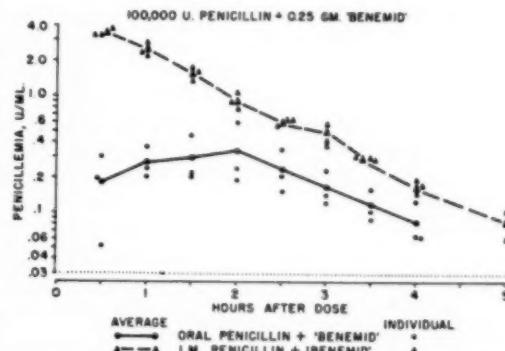
In another experiment, the same dogs each were given an initial dose of 300,000 units of aqueous crystalline procaine penicillin G intramuscularly, and at intervals of eight hours thereafter for six periods, 1 remanden tablet orally. During this period of more than fifty-six hours, levels of penicillin in excess of 0.20 unit per milliliter of plasma were maintained.

Graph 4 gives the average concentration of penicillin in the plasma of 6 dogs, resulting from the coadministration of intramuscular crystalline procaine penicillin G intramuscularly and of remanden tablets orally.

DISCUSSION

Because of the rapid disappearance of penicillin from the blood stream, and the speed with which it is excreted through the kidneys, one of the chief problems with its therapy has been the maintenance of significant therapeutic blood levels. Even though a single intravenous injection of penicillin will establish a blood level promptly, there is urinary recovery of most of the agent within one hour. The corresponding fall in the concentration of penicillin plasma, although not as rapid, is characteristically similar after the injection of a single dose either intramuscularly or subcutaneously.²⁰

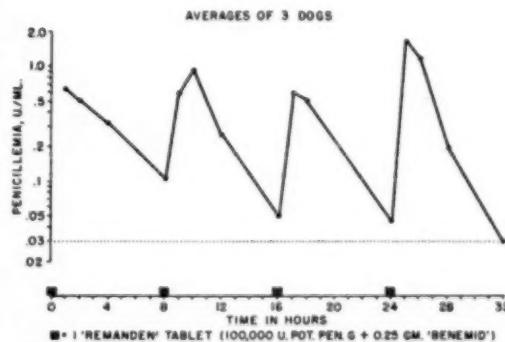
Russo and his associates¹⁷ observed in one experiment that, following the oral ingestion of 100,000 units of penicillin G,



Graph 1—Oral potassium penicillin G plus benemid, versus crystalline potassium penicillin G, intramuscularly, plus benemid orally.

there was approximately 10 per cent of the agent in the urine within four hours. Thus, the rapidity with which penicillin disappears from the blood stream, regardless of its route of administration, is determined chiefly by the rate at which penicillin is excreted into the urine. Since approximately 70 to 80 per cent of penicillin in the blood stream is secreted from the body through the renal tubules, in comparison to approximately 20 to 30 per cent ultrafiltered through the glomeruli, it is logical to assume that the utilization of any agent that will compete with penicillin for the enzymes required for its excretion via the renal tubules not only will enhance and prolong the concentration of this antibiotic in the body tissues, but also will provide for the maintenance of a more effective level of penicillin in the plasma of the patient.

Benemid is one of the compounds synthesized by Miller, Ziegler, and Sprague²¹ during their search to find an agent that



Graph 2—Penicillin plasma concentrations following oral administration of remanden.

*Remanden is Merck & Co., Inc.'s trademark for its brand of penicillin and benemid.

would inhibit the excretion of penicillin through the renal tubules.

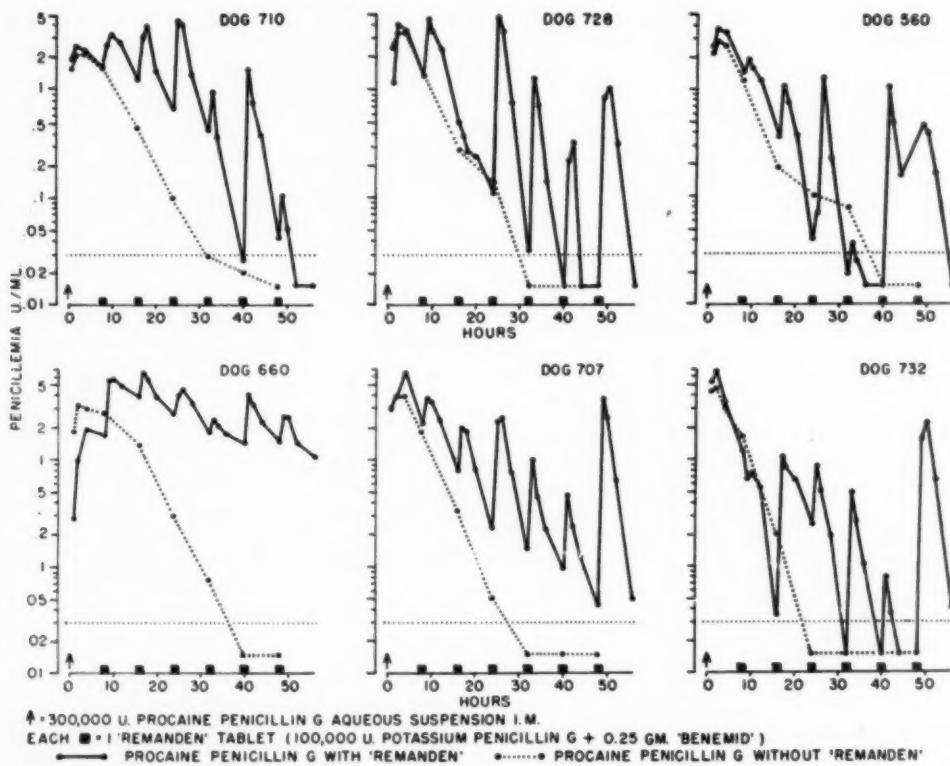
According to Beyer *et al.*²²⁻²³ benemid functions "as an anticatabolite, since it permits a greater physiological economy of the therapeutic agent by inhibiting its inactivation or elimination." Also, he has indicated that benemid retards the renal tubular secretion of penicillin "by inhibiting a definitive enzyme that requires a source of high phosphate bond energy for the completion of at least one reaction involved in secretion."

It has been demonstrated that benemid has no inhibitory influence on the excretion of terramycin,[®] streptomycin, aureomycin, or chloramphenicol.²⁴ Observations by Crosley and his associates²⁵ have shown that benemid, coadministered orally with a triple sulfonamide combination, had an enhancing effect not only on both the free and total concentrations of sulfonamide in the plasma, but also on the level of penicillin in the plasma.

Following the oral administration of a single dose, benemid rapidly is absorbed

and a determinable concentration in the plasma persists for forty-four to forty-eight hours. Beyer *et al.*²³ indicated that this persistent and detectable concentration in the blood stream is due to the reabsorption of the compound by the renal tubules. The agent is well tolerated by both man and animals and is relatively nontoxic in useful dosages.

Undoubtedly, the reader's interpretation of the results of the study will raise questions about the apparent inability of the penicillin administered orally to maintain a continuous sustained high penicillemia. Because penicillin is both bacteriostatic and bactericidal, the rationale of having high sustained levels of penicillin in the blood has merit and, clinically, it has worked well. Yet, as pointed out by Welch,²⁶ the now standardized procedure of maintaining a plasma concentration of 0.03 unit per milliliter or better, even though it has proved satisfactory for use in the treatment of most sensitive infections, in itself is "an arbitrary figure and it was chosen because of limitations of the bioassay meth-



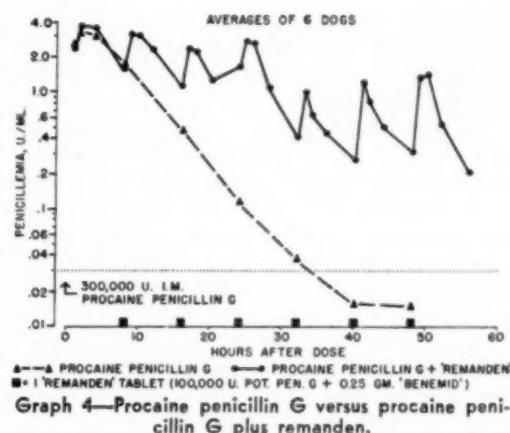
od utilized for determining blood concentrations of penicillin in man."

The qualitative differences between the detectable concentration of penicillin existing in the blood stream, the body tissues, and lymph has been demonstrated in dogs.²⁷ The evidence presented indicated that not only were concentrations of penicillin in the lymph of longer duration than in the blood, but that there was an accumulation of the drug in both liver and kidneys six to eight hours following its disappearance from the blood and lymph.

It would seem that the important fact to understand regarding good penicillin therapy rests with the statement by Eagle²⁸ that "it is the concentration at the focus of infection which is the important therapeutic consideration and the plasma level is of significance insofar as it provides a measure of that tissue concentration." When estimating the degree of the concentration of the agent in body tissues necessary for maximal effectiveness, one must consider also the site of pathology, the relative vascularity of the area, and the rate of inactivation of penicillin at the site of infection.

The magnitude of bacterial resistance or "penicillin sensitivity" has not been studied conclusively in veterinary medicine. However, in human patients treatment of disease in an avascular area, notably bacterial endocarditis where the diffusion of penicillin is limited by vegetative growths, or meningitis, where diffusion is limited by the blood-brain barrier, require the use of repeated high doses in order to drive sufficient penicillin into either the vegetations or the cerebrospinal fluid.²⁹

The significance of nondetectable concentrations of penicillin in the blood stream has been investigated in a number of experimentally induced infections in laboratory animals.³⁰⁻³¹ It was noted that the microorganisms died at a rapid rate so long as the level of the antibiotic agent remained at bactericidal concentrations. When the concentration of the drug fell below the effective level, usually for a period of hours, there was either continuing death of the bacteria due to the toxic action of the drug or the surviving organisms ceased multiplying and remained static. During the "penicillin-free interval" the surviving organisms are susceptible to the defense mechanisms of the host.



Graph 4—Procaine penicillin G versus procaine penicillin G plus remanden.

Obviously, there is a limit to the duration of time during which a nondetectable penicillemia may be extended without modifying the therapeutic response. This danger always exists when one is treating infections caused by organisms resistant to penicillin, highly acute fulminating infections, or diseases caused by rapidly multiplying bacteria. However, as Eagle²⁸ has suggested, a schedule of treatment that provides both a bactericidal concentration of the antibiotic drug at the "focus of infection" and the utilization of the defense mechanisms of the host makes possible the use of "discontinuous administration."

It has been shown that, when treating bacterial lobar pneumonia in human patients with large doses of oral penicillin, the response to therapy was good, even though the penicillemia was not detectable at all times. During intervals when the penicillin level could not be measured in the blood stream, the body tissues contained appreciable amounts of the drug, since it continued to be excreted in the urine.⁵

Bogert³² has studied the "discontinuity" plans of therapy, using penicillin given orally for the treatment of penicillin-sensitive infections in human patients. He indicated that: "(1) Illness, including pneumonia, prolongs the penicillemia from any given dose of antibiotic; (2) a detectable penicillemia for as short as twelve hours may be curative."

SUMMARY

The results of this study in dogs indicate that:

- 1) The oral administration of 0.25 Gm. of benamid® will enhance the penicilemia of penicillin administered either orally or intramuscularly.
- 2) The oral administration of remanden, at intervals of eight hours, will raise the penicilemia to high and sustained levels.
- 3) Remanden,® orally administered, will initiate and sustain levels in the blood stream equivalent to those obtained by the intramuscular injection of crystalline penicillin.
- 4) By retarding the elimination of penicillin from the body through the urine, benemid is capable of maintaining a penicilemia in excess of 0.20 unit per milliliter of plasma.

CONCLUSIONS

1) The use of orally administered penicillin in dogs is justified since reproducible detectable levels of penicillin in the plasma are observed.

2) In the treatment of many common infections caused by penicillin-sensitive organisms, or where highly sustained penicilemia is essential to overcome infections by microorganisms, either of unknown sensitivity or of high resistance, the use of remanden is recommended.

3) Both the rapid absorption and the high sustained levels of penicillin in the plasma would indicate that remanden therapy should be successful in the treatment of infections where it is required that penicillin diffuse into relatively avascular areas.

4) In the treatment of acute or fulminating infections, it may be desirable to begin the course of penicillin therapy with an intramuscular injection as a priming dose, followed by 1 remanden tablet orally every eight hours.

References

- ¹Hoffman, W. S., and Volini, I. F.: Studies in the Oral Administration of Penicillin, II. Results of Treatment of Pneumococcal Lobar Pneumonia and Other Acute Infections with Several Oral Penicillin Preparations. *Am. J. M. Sci.*, 213, (1947): 520.
- ²Finland, M., Meads, M., and Ory, E. M.: Oral Penicillin. *J.A.M.A.*, 129, (1945): 315.
- ³Austrian, R., Mitick, G. S., Rogers, D. E., Sessions, S. M., Tumulty, P. A., Vickers, W. H., Jr., and Zubrod, C. G.: The Efficacy of Modified Oral Penicillin Therapy of Pneumococcal Lobar Pneumonia. *Bull. Johns Hopkins Hosp.*, 88, (1951): 264.
- ⁴Dowling, H. F., Rotman-Kavka, G., Hussey, H. H., and Hirsh, H. L.: The Treatment of Pneumococcal Pneumonia with Oral and Intramuscular Penicillin. *Am. J. M. Sci.*, 213, (1947): 413.
- ⁵Flippin, H. F., Mateucci, W. V., Schimmel, N. H., and Boger, W. P.: Aureomycin, Chloramphenicol, and Penicillin in Treatment of Bacterial Pneumonia. *J.A.M.A.*, 147, (1951): 918.
- ⁶Bunn, P., Caldwell, E. R., Adair, C., Lepper, M., and Dowling, H. F.: Absorption and Clinical Use of Penicillin Preparations Given in Large Oral Doses. *J.A.M.A.*, 144, (1950): 1540.
- ⁷Rammelkamp, C. H., and Keefer, C. S.: Absorption, Excretion and Distribution of Penicillin. *J. Clin. Invest.* 22, (1943): 425.
- ⁸Boger, W. P., Gallagher, M. E., and Pitts, F. W.: The Effect of a New Benzoic Acid Derivative on Penicillin and Para-Aminosalicylic Acid (PAS). *J. Philadelphia Gen. Hosp.*, 1, (1950): 51.
- ⁹Abraham, E. P., Chain, E., Fletcher, C. M., Gardner, A. D., Heatley, N. G., Jenning, M. A., and Florey, H. W.: Further Observations on Penicillin. *Lancet*, 2, (1950): 177.
- ¹⁰Seeberg, V. P., Illig, P. L., Brown, Doris Jane: The Gastrointestinal Absorption and Destruction of Penicillin. *J. Am. Pharm. A.*, 35, (1946): 280.
- ¹¹Rammelkamp, C. H., and Helm, J. D.: Studies on the Absorption of Penicillin from the Stomach. *Proc. Soc. Exptl. Biol. & Med.*, 54, (1943): 324.
- ¹²Boger, W. P., Bayne, G. M., Carfagno, S. C., and Glyfe, J.: Oral Penicillin: Evaluation of Available Dosage Forms. *Scient. Exhibit.*, (1953): 7-9.
- ¹³Welch, H., and Lewis, C. N.: Antibiotic Therapy. *The Arundel Press, Inc.*, Washington, D. C., (1951): 66.
- ¹⁴Abraham, E. P., and Chain, E.: An Enzyme from Bacteria Able to Destroy Penicillin. *Nature*, 146, (Dec. 28, 1940): 837.
- ¹⁵McDermott, W., Bunn, P., Benoit, M., Du Bois, R., and Reynolds, M.: Absorption, Excretion and Destruction of Orally Administered Penicillin. *J. Clin. Invest.*, 25, (1946): 190.
- ¹⁶Boger, W. P., and Beatty, J. O.: Procaine Penicillin Administered Orally, Comparison with Sodium Penicillin. *J. Invest. Dermatol.*, 15, (1950): 373.
- ¹⁷Russo, H. F., Gass, S. R., Miller, A. K., and McConville, C.: Gastro-Intestinal Absorption of Aqueous Penicillin by Dogs. *North Am. Vet.*, 31, (1950): 28.
- ¹⁸Davidson, J. L., Stocking, G. G., Snyder, B. S., Wiley, Jean, and Troast, Margaret A.: Penicillin and Sulfonamide Blood Levels in Dogs Following Oral Use of Biosulfa Tablets. *North Am. Vet.*, 32, (1951): 482.
- ¹⁹Burke, J. C.: Methods in Medical Research. Vol. 1. *Yearbook Publishing Co.*, Chicago, Ill., (1948): 25.
- ²⁰Beyer, K. H.: Pharmacological Basis of Penicillin Therapy. *Charles C. Thomas Publisher*, Springfield, Ill., (1950): 26-28.
- ²¹Miller, C. S., Ziegler, C., and Sprague, J. M.: To be published.

²²Beyer, K. H., Wiebelhaus, V. D., Russo, H. F., Peck, H. M., and McKinney, S. E.: Benemid (p-(di-n-Propylsulfamyl)-Benzoinic Acid)—An Anticatabolite: Its Pharmacological Properties. *Fed. Proc.*, 9, (1950): 258.

²³Beyer, K. H., Russo, H. F., Tillson, E. K., Miller, A. K., Verwey, W. F., and Gass, S. R.: Benemid (p-(di-n-Propylsulfamyl)-Benzoinic Acid: Its Renal Affinity and Its Elimination. *Am. J. Phys.*, 166, (1951): 625.

²⁴Boger, W. P., Matteucci, W. V., Beatty, J. O.: Benemid (p-(di-n-Propylsulfamyl)-Benzoinic Acid): Lack of Effect on Aureomycin, Chloromycetin, Streptomycin and Terramycin. *Proc. Soc. Exptl. Biol. & Med.*, 76, (1951): 222.

²⁵Crosley, A. P., Bayne, G. M., Carfagno, S. C., and Boger, W. P.: Effects of p-(di-n-Propylsulfamyl)-Benzoinic Acid (Benemid) on Free and Total Sulfonamide Plasma Levels. *J. Lab. Clin. Med.*, 40, (1952): 730.

²⁶Welch, H., and Lewis, C. N.: Antibiotic Therapy. The Arundel Press, Inc., Washington, D. C., (1951): 62.

²⁷Schachter, R. J.: Fate and Distribution of Penicillin in the Body. I. Circulation of Penicillin in the Lymph. *Proc. Soc. Exptl. Biol. & Med.*, 68, (1948): 29.

²⁸Eagle, H., Fleischman, R., and Musselman, A. D.: Effect of Schedule of Administration of Therapeutic Efficacy of Penicillin: Importance of Aggregate Time Penicillin Remains at Effectively Bactericidal Levels. *Am. J. Med.*, 9, (1950): 280.

²⁹Beyer, K. H.: Pharmacological Basis of Penicillin Therapy. Charles C. Thomas, Springfield, Ill., (1950): 75-76.

³⁰Eagle, H., Fleischman, R., and Musselman, A. D.: Bactericidal Action of Penicillin in Vivo: Participation of Host and Slow Recovery of Surviving Organisms. *Ann. Int. Med.*, 33, (1950): 554.

³¹Eagle, H., Fleischman, R., Levy, M.: "Continuous" vs. "Discontinuous" Therapy with Penicillin. *New England J. Med.*, 248, (1953): 12.

³²Boger, W. P., Oritt, J. E., Israel, H. L., and Flippin, H. F.: Procaine Penicillin G in Oil: I. Plasma Concentrations; Preliminary Observations on Its Use in Pneumonia. *Am. J. M. Sci.*, 215, (1948): 250.

Excision of Infected Area in Tetanus.—A physician relates an experience with a fairly severe case of tetanus while with an ambulance unit; no tetanus antitoxin was available. The site of infection was a wound of the thumb of three weeks' duration; symptoms of tetanus had been present for ten days. The terminal phalanx was amputated and after two weeks the spasms started to abate. The only treatment available was sedatives.—*Brit. M. J.*, Dec. 5, 1953.

The Production of Hyperkeratosis (X Disease) by a Single Administration of Chlorinated Naphthalenes

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The production of bovine hyperkeratosis (X disease) by lubricants containing chlorinated naphthalenes has been reported.^{1,2} The chlorinated naphthalenes, in various forms, have also been used to produce the disease under experimental conditions.^{3,5} They were identified in the one lot of German wood preservative that had been observed as a factor in outbreaks in Germany.^{4,6} The identity of the toxic substance in the other materials found capable of producing the disease has not been reported. In the initial observations that led to the study of the lubricant that was apparently involved,¹ repeated and prolonged exposure to varying amounts of the lubricant was evident. Later reports and observations on other premises suggested that a single exposure to relatively small amounts of the toxic material was sufficient to cause the production of typical symptoms and lesions. This report describes the results of a single oral administration of chlorinated naphthalenes and of a lubricant containing chlorinated naphthalenes to calves.

MATERIALS AND METHODS

Normal calves were obtained from the dairy herds of the Virginia Polytechnic Institute at weaning time. The ration of home-grown hay and a commercial calf supplement was the same as used for the calves in the parent herds. At the time of use, the calves were 4 to 5 months of age and ranged in weight from 135 to 211 lb.

The chlorinated naphthalenes, which have been described elsewhere,³ and the lubricant were furnished by the Sinclair Research Laboratories, Inc. These compounds were put into a 3 per cent

This work was done in co-operation with the Bureau of Animal Industry, U.S.D.A., under inter-regional agricultural experiment research on the project entitled "X-Disease (Hyperkeratosis) of Cattle."

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The author expresses his appreciation to the Sinclair Refining Company and the Sinclair Research Laboratories, Inc., for financial aid and technical assistance; to the Department of Dairy Husbandry of the Virginia Polytechnic Institute for making calves available; and to Drs. S. G. Guss, G. C. Fleck, and H. K. Royer, Lynchburg, Va.; and Mr. R. L. Westing, Staunton, Va., for reporting their observations.

solution in a vegetable oil. The lubricant, which had a 5 per cent content of chlorinated naphthalenes, had been shown to produce the disease when used in repeated doses. Each was given orally in gelatin capsules to the calves.

RESULTS AND DISCUSSION

The principal results are summarized in table 1.

TABLE I—Effects on Calves of a Single Administration of Chlorinated Naphthalenes

Calf (No.)	Material ¹ admin.	Material admin. (Gm.)	Mg./lb. body wt. chloronaph.	Days to Symptoms	Autopsy	Remarks
1518	Sol. Penta— ²	45.0	10.0	3	57	Hyperkeratosis
1530	Sol. Hexa—	29.0	5.0	3	14	Hyperkeratosis
1510	Lubricant	58.6	8.0	3	46	Hyperkeratosis
1531	Control	—	—	—	—	Negative

¹Three per cent of each material was chlorinated naphthalene. — = chloronaphthalene.

Three days after the administration of the materials, calves 1518, 1530, and 1510 were listless, with lacrimation, excessive salivation, and had nasal discharges. Calf 1530 declined rapidly and was found dead on the fourteenth day. Autopsy revealed wartlike proliferations on the dental pad, upper lip, and tongue; enlarged and mottled liver; enlarged, pale kidneys; several flat ulcers in abomasum; greatly distended gall bladder; and pneumonia in the anterior lobes of both lungs. The rapid failure of calf 1530 was due in part to the secondary complications which developed about a week after administration of the hexachloronaphthalene. Losses from secondary complications that follow ingestion of toxic amounts of hyperkeratosis-producing materials probably occur frequently in the young calf. Calf 1510 died on the forty-sixth day. Well-defined thickening of the skin, as well as papillary proliferations on the tongue, had developed. The kidneys were enlarged and pale; the liver enlarged with some evidence of bile duct proliferation; the gall bladder was distended and numerous cystlike nodules were present on the mucosa; and the epididymis of one testicle was enlarged and hard. Calf 1518 was killed on the fifty-seventh day. At the time of autopsy, the skin was thickened over the head, neck, and sides; the liver presented some evidence of fibrosis and bile duct proliferation; and the kidneys were slightly enlarged and numerous gray areas on the surface also extended into the cortex.

Microscopic examination of tissues from calf 1530 revealed: dilatation of the

tubules of the renal cortex and degeneration of the tubule cells; bile duct proliferation and degeneration of liver cells; and papillary proliferation of the oral mucosa. Although secondary complications developed which hastened the death of this calf, the microscopic lesions present in the liver and kidney were characteristic of the

changes caused by the chlorinated naphthalenes. The extent of the damage was comparable to that seen in other calves receiving the same level of toxic substance.^{2,3} The changes observed in the tissues from calves 1510 and 1518 included: dilatation of the tubules of the renal cortex; squamous metaplasia of the epididymis and of the ducts of the parotid gland; bile duct proliferation and fibrosis of the liver; and hyperkeratosis of the skin.

The response of the calves to a single oral administration of chlorinated naphthalenes in a vegetable oil or in a lubricant demonstrated that repeated ingestion is not necessary in order to produce bovine hyperkeratosis. Field cases have undoubtedly appeared as the result of a single exposure since the total amount of vehicle carrying a toxic dose can be small.

References

- Bell, Wilson B.: The Production of Hyperkeratosis by the Administration of a Lubricant. *Virginia J. Sci.*, 3, (1952): 71.
- Bell, Wilson B.: Further Studies on the Production of Bovine Hyperkeratosis by the Administration of a Lubricant. *Virginia J. Sci.*, 3, (1952): 169.
- Bell, Wilson B.: The Relative Toxicity of the Chlorinated Naphthalenes in Experimentally Produced Bovine Hyperkeratosis (X-Disease). *Vet. Med.*, 48, (1953): 135.
- Olafson, P., McEntee, K., and Hansel, W.: Progress in Research on Hyperkeratosis (X-Disease) in Cattle. *Proc. 1952 Cornell Nutr. Conf. for Feed Manufacturers*, (1952): 72.
- Sikes, D., and Bridges, M. E.: Experimental Production of Hyperkeratosis (X-Disease) of Cattle with a Chlorinated Naphthalene. *Science*, 116, (1952): 506.
- Wagener, K.: Hyperkeratosis in Germany. *J.A.V.M.A.*, 179, (1951): 133.

The Treatment of Ketosis in Dairy Cows by Oral Administration of Sodium Acetate

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IN A STUDY, with dairy cows, of the relationship of the amount and physical state of the roughage fed to the fat content of their milk, Tyznik⁸ found that the acetates produced by the rumen microorganisms seem to play an essential role in the synthesis of milk fat. On an extremely low roughage and high concentrate ration, the fat content of the milk and the acetic acid content of the rumen ingesta were depressed simultaneously, with an immediate recovery of the milk fat level when sodium acetate was fed. The quick response of the milk fat test to feeding of acetates suggested that they might be of therapeutic value in cases of ketosis.

Some of the lower fatty acids, including acetic acid, are absorbed directly from the rumen into the blood stream, thus becoming available more quickly than most other materials given orally. Acetic acid is a readily metabolized source of energy which is described by Hawk, Oser, and Summerson¹ as occupying "a key position in the metabolism of not only fatty acids but also carbohydrates and certain amino acids."

Schultz, Smith, and Lardy² found that acetic and propionic acids administered orally or intravenously caused no increase in blood ketone levels of normal goats, but butyric, caproic, caprylic, and capric acids caused marked increases.

Schultz and Smith³ found that butyric acid, given orally, caused depressed blood sugar, with increased blood ketones. Propionic acid caused a sharp increase and acetic acid a slight increase in blood sugar. Plaut and Smith,⁴ using a radioactive caproate, have shown conversion of caproate to acetooacetate. These reports have indicated that the fatty acids produced by the rumen microorganisms may play a part in the occurrence of ketosis in ruminants. Schultz⁵ has reported encouraging results from feeding sodium propionate to cows with ketosis.

From the Department of Dairy Husbandry, University of Wisconsin, Madison; Dr. Miller is now in the Department of Dairy Husbandry, University of Georgia, Athens; Dr. Tyznik, in the Department of Animal Husbandry, Ohio State University, Columbus; and Dr. Sorensen, at the School of Veterinary Medicine, University of Minnesota, St. Paul.

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Tyznik in 1951⁶ fed sodium acetate to 6 dairy cows, all of which showed definite clinical signs of ketosis and a positive qualitative urine reaction. Four which had received no previous treatment recovered after feeding $\frac{1}{4}$ lb. of sodium acetate daily for four successive days. The urine test became negative in two to five days. Another, fresh six weeks, had been treated four times with glucose and once with chloral hydrate, but had relapsed after each treatment. After four daily feedings of $\frac{1}{4}$ lb. of sodium acetate, she recovered from clinical signs and had a negative urine test. The sixth cow had relapsed after five treatments with intravenous glucose and had severe clinical signs. She was fed $\frac{1}{2}$ lb. of sodium acetate daily for seven successive days. Within eight hours after the first feeding, she was on her feet and eating and in seven days recovery was complete, including a negative urine test. None of these cows suffered any recurrence. Recovery of appetite and milk production was striking.

A coöperating dairyman who was encountering frequent cases of ketosis treated 5 cows in early lactation with one or more feedings of sodium acetate. All recovered from clinical signs, with a marked stimulation of appetite and milk production and a negative urine reaction in all except 1. Two cows in other herds, both showing clinical signs and positive urine tests, were treated by feeding sodium acetate. One recovered from clinical signs after two days of feeding $\frac{1}{4}$ lb. of sodium acetate daily. The other, which had metritis, previously had failed to respond either to glucose or to sodium acetate. After being fed 1 lb. of sodium acetate daily for twenty days, she recovered completely from clinical signs and had a negative urine test, but a simultaneous recovery from metritis may have been responsible to a greater degree than the treatment.

PRESENT STUDY

To secure a more accurate evaluation of sodium acetate as an aid to treatment of ketosis, 34 additional cases were studied in eight herds in which blood and urine samples could be taken. Blood sugar and blood and urine ketones were determined on samples taken before acetate was given, and periodically thereafter. A qualitative urine test also was run on most of the urine samples. These cases varied in severity, but only clear-cut cases, as judged by clini-

cal signs and urine tests, are reported. The results are summarized in table 1.

Of these 34 cases, 16 recovered in less than two weeks and 2 others in less than three weeks with no treatment other than oral sodium acetate. The amounts fed varied from $\frac{1}{4}$ to 1 lb. daily. In the following 6 cases, the effect of the acetate could not be appraised: in 3, because of other treatment; in 1, because it was not possible to observe the cow after her reported recovery; case 20, because of complication by metritis (while her general condition was improving, the blood picture did not indicate recovery); and case 19, because of a severe gangrenous pneumonia, with an abnormally high blood sugar (blood and urine ketones returned to a normal level follow-

ing treatment, even though she was not eating, and death ensued after the third day).

In the remaining 10 cases, recovery did not occur within a reasonable time. Nine of these also had glucose therapy, to which only 1 responded; 2 of them also showed no improvement from sodium propionate given orally. Two had uterine infections and did not recover from signs of ketosis until the infections subsided. Five of the 10 recovered when put on good pasture.

In general, the blood sugar increased and blood and urine ketone values decreased with the progress of recovery.

Four cows in another herd, which manifested clinical signs of ketosis, recovered when given $\frac{1}{2}$ lb. of sodium acetate daily for four successive days. Their blood and

TABLE I—Effect of Sodium Acetate on Blood Values of Cows with Ketosis

Case (No.)	Before treatment				After treatment				Sodium acetate	
	Milk lb.	Blood sugar mg. %	Blood ketones mg. %	Urine ketones mg. %	Milk lb.	Blood sugar mg. %	Blood ketones mg. %	Urine ketones mg. %	Period fed (days)	Total amount lb.
RECOVERED WITHOUT OTHER TREATMENT										
1	36	41	9	97	35	52	4	12	6	1.75
2	35	34	29	....	40	57	5	7	5	4.50
3	43	53	13	152	57	61	4	4	8	7.50
4	25	36	15	....	32	52	4	22	11	5.50
5	45	34	16	132	42	51	5	21	9	2.50
6	35	46	12	148	38	52	5	38	13	2.50
7	38	42	19	65	54	62	4	11	11	2.63
8	....	35	31	335	....	58	4	6	17	12.03
9	48	47	25	146	....	59	7	....	20	17.00
10	42	39	17	154	58	86	2	7	10	9.50
11	....	60	8	....	....	52	4	....	3	2.00
12	37	59	3	28	41	60	2	5	4	1.00
13	....	45	4	15	....	52	3	8	2	0.50
14	48	58	9	18	72	59	3	10	7	6.00
15	50	44	7	43	53	51	7	24	4	3.50
16	42	50	6	91	49	50	6	11	8	8.00
17	49	42	4	75	83	50	5	20	7	6.00
18	....	....	..	23	....	57	2	5	1	0.50

RESULTS QUESTIONABLE DUE TO COMPLICATIONS, INCOMPLETE INFORMATION, OR OTHER TREATMENTS

19(a)	....	93	16	85	....	104	6	3	3	1.50
20(b)	70	....	36	....	72	39	30	....	13	7.50
21(c)	35	30	13	196	36	44	13	145	7	3.00
22(d)	66	56	5	....	63	52	3	....	7	6.50
23(d)	54	32	32	....	52	53	36	....	5	5.50
24(d)	36	46	29	821	47	61	7	27	11	9.50

NO APPARENT BENEFIT FROM SODIUM ACETATE

25(b,c)	64	51	21	52	68	45	23	61	5	4.50
26(f)	47	38	8	73	44	46	12	74	25	10.25
27(h,e)	39	31	11	74	40	41	8	48	7	3.00
28(e)	28	38	14	205	24	36	37	648	37	6.75
29(e)	66	46	27	....	72	51	18	....	16	15.00
30(e)	61	28	20	138	63	43	12	311	22	11.50
31	35	46	21	234	....	40	30	331	14	8.50
32(e)	30	47	19	82	....	36	34	145	7	7.00
33(e,g)	52	40	34	271	58	34	44	530	5	3.50
34(e,g)	56	48	19	214	45	45	32	394	5	3.50

(a) Ketosis secondary to pneumonia with elevated temperature and high blood sugar — died after third day; (b) metritis; (c) no opportunity for later samples — owner reported recovery without further treatment; (d) also received glucose therapy — recovered from clinical signs; (e) also failed to respond to glucose therapy; (f) recovered following two intravenous glucose treatments; (g) also failed to respond to sodium propionate, given orally.

urine were not analyzed and they are not included in table 1.

DISCUSSION

It is difficult to evaluate accurately any treatment for ketosis. Since it is not possible to produce experimentally the condition as it occurs in the field, the investigator is limited to naturally occurring cases, which necessitates coöperation in privately owned herds where part of the animals can not be left without treatment to serve as controls, nor can other treatment be forbidden.

Probably a fair percentage of animals would recover spontaneously within a reasonable time; consequently, the value of any treatment is likely to be overestimated. Satisfactory information on the frequency or pattern of spontaneous recovery is not available to provide a standard for evaluating the effectiveness of treatment. Furthermore, ketosis occurs in varying degrees of severity and may be complicated by various contributing factors.

In the cases reported, there was no selection except that those with a questionable diagnosis were omitted. The blood ketone level of some of the cases shown in table 1 was within a range ordinarily considered normal, but all showed definite clinical signs with the odor of acetone on the breath, anorexia, and positive qualitative urine reaction.

The frequency of recovery was sufficiently high to indicate either that the acetate treatment was beneficial or that there may be reason to question the justification for routine treatment. The pattern of recovery in relation to treatment indicated that the sodium acetate contributed to recovery. Only 1 of the 10 which did not respond to acetate responded to other treatment.

The sodium salt of the acetate was used, since it is inexpensive, readily obtainable, and not unpalatable to most animals. Since sodium compounds from saliva are the principal buffering agents in the rumen, the fatty acids produced by rumen fermentation are probably absorbed as sodium salts. These fatty acid compounds appear to be absorbed directly from the rumen, reaching the blood stream quickly.

The acetate, a readily metabolized source of energy, may have a sparing action on blood sugars, or may contribute directly to complete oxidation of the fats. The so-

dium, by increasing the alkali reserves of the blood, may contribute to relief of any acidosis caused by the ketones in the blood stream.

Also, sodium acetate seemed to have a stimulating effect on the appetite of some animals. It is nontoxic, as indicated by a trial with 18 normal cows fed 1 lb. per head daily during ten-day periods.

Sodium acetate should be compatible with other treatments and may have value when used in combination with them. While in some cases the apparent response to acetate feeding was almost immediate, usually the reaction was slower than with glucose therapy. The frequency of ketosis recurrence following a single intravenous treatment with glucose suggests that oral sodium acetate might be useful following glucose therapy. Favorable results from such use in a few cases have been reported by a coöperating veterinarian. More observations are needed for adequate evaluation of this treatment.

SUMMARY

Sodium acetate was fed at rates varying from $\frac{1}{4}$ to 1 lb. daily to 34 cows showing signs of ketosis. Blood sugar and ketones and, in most cases, urine ketones were determined.

Of the 34 cases, 18 recovered with no other treatment, 6 were confused by complicating factors, incomplete information, or by other treatment given simultaneously, and 10 failed to respond. Of the 10, 8 also failed to respond to intravenous glucose treatment, and 2 of the 8 to sodium propionate feeding. Only 1 of the 10 responded to glucose therapy.

Fifteen other cows from which blood samples were not analyzed made satisfactory recoveries from clinical signs following sodium acetate as the sole treatment.

References

¹Hawk, P. B., Oser, B. L., and Summerson, W. H.: Practical Physiological Chemistry. 12th ed. The Blakiston Co., Philadelphia, (1947): 927.

²Plaut, G. W. E., and Smith, V. R.: Conversion of Caproic Acid to Acetoacetic Acid in the Goat. Proc. Soc. Exptl. Biol. & Med., 76, (1951): 104-105.

³Schultz, L. H.: Treatment of Ketosis in Dairy Cattle with Sodium Propionate. Cornell Vet., 42, (1952): 148-155.

⁴Schultz, L. H., and Smith, V. R.: Experimental Alteration of the Sugar and Ketone Levels of the

Blood of Ruminants in Relation to Ketosis. J. Dai. Sci., 34, (1951): 1191-1199.

^aSchultz, L. H., Smith, V. R., and Lardy, H. A.: The Effect of the Administration of Various Fatty Acids on the Blood Ketone Level of Ruminants. J. Dai. Sci., 32, (1949): 817-822.

Tyznik, W. J.: The Effect of the Amount and Physical State of the Roughage upon the Rumen Fatty Acids and Milk Fat of Dairy Cows. Ph.D. Thesis, University of Wisconsin, 1951.

Transmissible Gastroenteritis in Pigs

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An enteric disorder of pigs in New York State, in 1950, was found to be identical to the transmissible gastroenteritis reported, in 1946, by Doyle and Hutchings.¹

Incubation.—The incubation period varied from twelve hours in a baby pig to ninety-six hours in an older pig but was usually twenty-four to forty-eight hours.

Oral Inoculation.—When 118 susceptible pigs from 2 to 120 days old were fed filtered or unfiltered intestinal mucosa, or blood, from an infected pig, 75 (63.5%) developed a mild fever but all developed diarrhea and signs of illness.

Parenteral Inoculation.—All of 4 pigs inoculated with filtrate intramuscularly, 3 of 6 inoculated subcutaneously, and all 3 inoculated intraperitoneally (total, 77%) developed a slight elevation of temperature but no other sign of infection.

Acquired Resistance.—When this same material was fed twelve days later to pigs inoculated intramuscularly, they showed no signs of illness; when fed seven days after the subcutaneous inoculations, those pigs developed characteristic signs of the disease. Pigs which recovered from infection showed no illness when reinoculated. However, antibody formation could not be demonstrated *in vivo*.

Mortality.—In this experiment, the mortality was: 100 per cent in pigs inoculated when less than 5 days old; 67 per cent when

inoculated at 6 to 10 days old; 30 per cent when inoculated at 11 to 15 days old; and 4 per cent when inoculated after 16 days of age.

The Virus.—The virus may be airborne, at least it spread to susceptible pigs, in a room with sick pigs, when all mechanical transfer was avoided. The virus was present in many tissues including the blood. It was most concentrated in the intestines and kidneys but it did not persist long in the latter. The virus persisted in the feces from 46 per cent of the recovered pigs for five weeks and of 8 per cent for eight weeks. However, virus was never demonstrated in the urine. The pigs which eliminated virus the longest usually made the slowest gain in weight.

Reference

¹Doyle, L. P., and Hutchings, L. M.: A Transmissible Gastroenteritis in Pigs. J.A.V.M.A., 108, (1946): 257.

When an animal with shipping fever develops pleuritis, as indicated by a rasping, brushing sound, an intrapleural injection of an aqueous solution of penicillin and streptomycin is beneficial. The needle should penetrate the longissimus dorsi muscle and the sixth intercostal space, and the injection should be made during expiration. The injection may have to be repeated in twenty-four hours.—G. F. Fehrenbacher, D.V.M., Illinois

Swine dysentery can be transmitted by feeding the colon of an infected pig, infected feces, or a pure culture of the Vibrio involved. The lesions are confined to the large intestine, except for a gastritis.—L. M. Hutchings, D. V. M., Indiana.

Acute swine erysipelas was more prevalent in Illinois in 1953 than in recent years. It is best controlled with simultaneous culture and antiserum but revaccination may be necessary in three months or less. Vaccinating gilts at breeding age is recommended to protect them and their litters, but this provides the pigs with only a passive immunity. The vaccination of baby pigs from nonvaccinated sows may be postponed, if no symptoms appear, until the pigs are older, when the immunity should be more lasting.—A. L. Starkey, D.V.M., Illinois.

This is a condensation of an article entitled "Transmissible Gastroenteritis in Pigs," by the above authors, which will be published in the July, 1954, issue of the American Journal of Veterinary Research. The work was done at the Veterinary Virus Research Institute, New York State Veterinary College, Cornell University, Ithaca, N. Y.

Notes from Symposium on Cholera Eradication

The pH of a virus can vary from 3 to 11 without affecting its virulence. Desiccated virus will live for three years. Free virus will live in contaminated pens for at least four weeks in cold weather but perhaps only twenty-four hours in warm weather.—*L. E. Boley, D.V.M., Champaign, Ill.*

Much is being learned about viruses in general. The delayed virus method of vaccination was introduced in an attempt to avoid "serum breaks" in hogs vaccinated at stockyards destined for feedlots. When virus was given at the farm three days later, the immunity was not satisfactory but when given seven to ten days later it was satisfactory. The incidence of cholera dropped steadily from 1939 to 1949, when more virulent virus was used than in any other decade; then came the "variants." The modified viruses have further confused the picture.—*J. D. Ray, D.V.M., White Hall, Ill.*

No disease has been satisfactorily eradicated solely by using a living immunizing agent. The first pilot test area for eradication of hog cholera will probably be Florida because of its favorable boundary and swine population. If so, more diagnostic laboratories may be established there. There could be nonsymptomatic carriers of hog cholera; theoretically it might be the raccoon or civet cat, whose natural habitat is quite similar to that of swine in the United States.—*L. M. Hutchings, D.V.M., Purdue University, Lafayette, Ind.*

Practitioners will support cholera eradication if the agricultural organizations will coöperate. Misinformation among laymen about the disease and the new vaccines is resulting in heavy vaccination losses. Some agency, with no monetary involvement, such as a state college, should study the vaccination problem and recommend the best methods to use. Perhaps the vaccination of all pigs with a killed vaccine should be compulsory but socialized vaccination must

be avoided.—*O. Minton, D.V.M., San Jose, Ill.*

Canada eradicates cholera; garbage is cooked and living vaccines are barred. In 1940, 36,000 affected swine were destroyed at a cost of \$205,000 but from 1947 to 1951 they had no cholera. The cost of eradicating cholera over this period averaged 0.5 cent per head, while controlling it in the United States averaged about \$1.00 per head. Whether it can be eradicated here depends chiefly on how energetically the attempt is made.—*M. E. Boyer, D.V.M., Freeport, Ill.*

Postvaccination Losses from Hog Cholera

The idea that hog cholera is a one-strain virus disease was exploded in 1949. Swine vaccinated with any commercial virus or virus vaccine may "break" if challenged by some of the field viruses.

Hogs occasionally do react and die from cholera after being vaccinated with modified live virus vaccine without serum. Fully susceptible pigs when vaccinated while recuperating from "flu" may not be permanently immunized.

Could it be that feeding antibiotic residue to swine interferes with establishing cholera immunity? Feeding antibiotic residues to hens does seem to be responsible for the unsatisfactory propagation of virus in chicken embryos as well as the unsatisfactory production of virus vaccines from eggs laid by these hens.

These things we should do: (1) We should reevaluate the scope and limitations of all biological prophylactics used for immunization against hog cholera; (2) we should continue to denounce the assurance given laymen that modified vaccines are unqualifiedly safe; and (3) we should discontinue making a positive diagnosis of hog cholera in swine previously vaccinated by others, without a thorough field and laboratory investigation.—*A. H. Quin, D.V.M., Missouri.*

Fowl cholera is apt to recur when a course of therapy, which uses a sulfonamide in the feed, is terminated. The only recourse is strict sanitation to prevent an overwhelming exposure.—*C. A. Brantly, D.V.M., University of Wisconsin, Madison.*

Notes from the symposium on hog cholera eradication presented at the annual meeting of the Illinois Veterinary Medical Association held in Chicago, Feb. 10-12, 1954. Dr. A. A. Legner, Leland, Ill., was the moderator.

Antibiotic Therapy in Anthrax

W. W. BAILEY, D.V.M.

Sussex, New Jersey

FOLLOWING the outbreak of 7 cases of anthrax in dairy cattle in Sussex County, New Jersey, during the spring of 1952, there was a demand by dairymen to have their animals vaccinated against this disease.

Between March 26 and May 19, I vaccinated 6,480 cattle and 51 horses with anthrax bacterin produced by three different companies. Cattle were injected posterior to the scapula, horses on the side of the neck. The dosage administered was in accordance with the manufacturer's instructions.

On May 17, I was called to see 2 cows with swellings in the region of the injection and extending below the knee. There was complete anorexia, a marked reduction of milk flow, and temperatures of 105 and 106 F.

It seemed improbable that there was any connection with the anthrax vaccination given on April 17. However, anthrax was diagnosed by the New Jersey Division of Animal Industry Laboratory and confirmed by the U. S. Bureau of Animal Industry.

SYMPTOMS

Symptoms exhibited by most cases were as follows: partial or complete anorexia; varying degrees of swelling, usually involving the foreleg, and varying from soft and edematous to firm and hard with more or less heat; reduction of milk flow from slight to complete; varying degrees of stiffness and lameness; depression; labored respiration; sway back; temperature from normal to 107.8 F.; and blood in the feces of 1 animal.

Some animals with normal temperatures showed extensive swellings, while others with high temperatures evidenced only slight or moderate swellings. The degree of stiffness and lameness was often more pronounced in animals with slight or moderate swelling. The animals affected varied from 6 months old to advanced age. Five cows aborted during the first few days of their illness.

This article is a sequel to "Anthrax—Response to Terramycin Therapy," which appeared in the April, 1953, issue of the JOURNAL, pp. 305-306.

Dr. Bailey is a general practitioner in Sussex, N.J.

At the beginning of the outbreak the herds were at pasture. Almost without exception, cases worsened on the rainy and rainy days. In good weather, the animals were turned out because exercise seemed to benefit them. In June, the animals were kept stabled during the day because the intense heat also seemed to affect them adversely.

There was a marked variation in the recovery rate. Some animals showed an improved appetite, milk flow, and reduction of swelling in two to four days. In others, the appetite improved in two to three days but the swellings persisted as long as six weeks and the return of milk flow was often incomplete and took as long as a month. Some cows in advanced lactation dried up.

A total of 208 cattle and 6 horses in 36 herds were treated. Of these, 4 cows and 2 horses died and 1 cow was destroyed. Anthrax organisms were recovered from 1 of these cows. With added experience, it is believed that the destroyed cow and 2 that died might have been saved. Of those last, 1 had received penicillin alone, 2, terramycin® alone; and 3, penicillin and terramycin in combination. In addition, 2 cows and 2 horses were found dead and 2 cows recovered without treatment. Thus, a total of 220 animals, or 3.37 per cent of those vaccinated, were affected.

The first case treated was on May 17—thirty days from the date of vaccination. The last case occurred on September 25—139 days after vaccination. An animal vaccinated on April 18, was found dead at pasture six months later, on October 19. Laboratory tests proved this animal to be anthrax-positive.

TREATMENT

Penicillin alone, penicillin and terramycin concurrently, and terramycin alone were the treatments used. The first few cases, treated with procaine penicillin G in aqueous suspension—3 million units once daily—responded satisfactorily. However, a few days later some new cases relapsed, even when 5 and 6 million units were administered; so it was decided to try terramycin in combination with penicillin. In twenty-

four to forty-eight hours, it was evident that much better results were being obtained. Later, terramycin was used alone to give results as good as did the combination.

The penicillin G, either in oil or in aqueous suspension, was given intramuscularly—9 million units daily; in 1 case, 12 million units was given twice daily. Once the penicillin G was given intravenously, but only in the initial treatment, for more rapid effect.

Terramycin was used mainly in the intravenous form—1 Gm./10 cc. of normal saline solution. Terramycin, 1.0 Gm. in 19 cc. of normal saline solution, 0.5 Gm. per site, into the gluteal muscles, was used in a few cases. A total of 542 Gm. of terramycin was used intravenously with no ill effects except in 2 animals where a small amount was deposited perivascularly. This resulted

stages of the disease and then finished with penicillin alone in an attempt to hold down the expenses of treatment. Had terramycin been used in the beginning and continued as long as treatment was necessary, the course of treatment probably would have been shorter.

With a few exceptions, treatment was administered once daily. The recovery period of some cases probably would have been shorter had treatment been administered twice daily.

Seven cases relapsed after treatment was discontinued; 2 in two days, and 1 each in four, five, seven, twelve, and eighteen days.

Of these 7, 3 had been treated initially with penicillin alone, 1 with penicillin and terramycin, and 3 with terramycin alone. Two of these animals showed swellings in the opposite leg from the first attack.

The following reports are typical.

TABLE I—Result of Treatment of 214 Animals

No. cases treated	Therapy	Cases recovered		Cases relapsed		Cases died		Ave. length therapy (days)
		(No.)	(%)	(No.)	(%)	(No.)	(%)	
79	penicillin	77	97.4	3	3.8	1	1.3	4.52
73	penicillin and terramycin	70	95.8	1	1.4	3	4.1	5.97
62	terramycin	60	96.7	3	4.8	2	3.2	3.34

in a slight swelling which disappeared in three to four days without treatment.

In animals weighing 700 lb. or more, terramycin was usually given at a rate of 2 Gm. the first day and 1 Gm. per day thereafter. In a few cases, however, the initial dose was 3 Gm. and in some cases, the second and third doses were 2 Gm. In 2 horses, the initial dose was 4 Gm. followed by 2 Gm. in eight to ten hours.

Of the 214 animals treated (table 1), 79 received penicillin alone, 73 penicillin and terramycin, and 62 terramycin alone. The average number of days of treatment per animal was 4.52 when only penicillin was used, 5.97 for combined penicillin-terramycin therapy, and 3.34 for terramycin alone. From these figures, it would appear that the penicillin-terramycin combination was the least effective and that terramycin by itself was the most effective. However, many of the most severe cases were in the penicillin-terramycin group and several of these had been treated a day or more with penicillin before terramycin was used. Others in this group were treated with terramycin-penicillin or with terramycin alone in the initial

CASE REPORTS

Case 1.—A 3-year-old, 800-lb., Guernsey, which had aborted in October, 1951, and was producing 20 lb. of milk daily was given anthrax bacterin on April 18, 1952. On May 20, her symptoms were: almost complete anorexia, modest swelling of right shoulder extending to below the carpus, marked lameness, no milk.

Case 2.—On September 25, the owner of a 6-year-old, 1,100-lb. Holstein-Friesian reported that the cow had an extensive swelling on its left side from the mid-cervical region, shoulder, and two-thirds of the left thoracic wall, ventrally to the medial line, both sides of the brisket, and to the fetlock. The cow, which was producing 48 lb. of milk daily, had been vaccinated with anthrax bacterin on May 8. Her appetite was almost normal, production about half normal, and her general attitude was good.

Case 3.—A 6-year-old, 1,050-lb. Jersey was treated with anthrax bacterin on April 18. She had been fresh for two months and had produced 60 lb. of milk daily. On May 20, she was reported ill with the following

TABLE 2—Record of Treatment of Guernsey with Anthrax (Case 1)

Date (a.m.)	Time (F.)	Treatment	Results
5/20	8:00	103.8	3 PA—i.m.
5/21	8:00	104.4	2 PA—i.m. 2 PO—i.m.
5/22	8:00	103.6	Slight improvement in appetite.
5/23	8:00	102.0	3 PO—i.m.
5/24	8:30	101.0	Swelling started to soften.
5/25	8:00	101.2	Appetite normal, 4 lb. milk daily.
5/26	8:00	101.2	Swelling increasing.
5/27	8:30	101.0	No change.
		None	Swelling receding, less lameness, appetite normal.
			Appetite normal, swelling decreasing, production increasing.

3 PA—i.m. = 3,000,000 units of penicillin G procaine in aqueous suspension, intramuscularly; 3 PO—i.m. = 3,000,000 units of penicillin G procaine in oil, intramuscularly.

One month later, production had increased to 30 lb. daily, which was 10 lb. above her preinfection average. Perhaps some latent infection from the abortion was removed by this treatment.

symptoms: marked anorexia; extreme swelling from top of left scapula to fetlock, left side of brisket and half of the left side of the neck posteriorly to the left thoracic and abdominal walls almost to the flank, and ventrally to the medial line. She also had a mechanical lameness due to the swelling which was firm and warm. Her milk production had dropped to 10 lb.

Case 4.—A 7-year-old Guernsey, weighing 1,050 lb. and producing 38 lb. of milk daily, had been treated with anthrax bacterin on April 18. On May 25, she had the following symptoms: complete anorexia, labored respiration, sway back, extreme depression, anxious facial expression, no milk, moderate swelling from right shoulder to carpus and right side of abdomen.

Case 5.—A 6-year-old, 1,200-lb. Holstein-Friesian was producing 50 lb. of milk daily when she was treated with anthrax bacterin on April 18. On June 27, she had complete anorexia, marked swelling from left shoulder to carpus and left side of brisket, and her milk production was only 2 lb.

Case 6.—On May 8, a 5-year-old, 900-lb., Guernsey, producing 35 lb. of milk daily, was treated with anthrax bacterin. On July 9 she had partial anorexia, moderate swelling of the left elbow to the knee, stiffness, and her milk production was down about 50 per cent.

TABLE 3—Record of Treatment of Holstein-Friesian (Case 2)

Date (a.m.)	Time (F.)	Treatment	Results
9/25	8:00	102.6	3 PA—i.m.
			3 PO—i.m.
9/26	8:30	102.0	Condition unchanged.
9/27	8:00	104.0	3 PA—i.m.
			3 PO—i.m.
9/27	5:00	102.6	Swelling increased, milk and appetite decreased, animal depressed.
9/28	8:00	102.0	Appetite better.
			Appetite normal, swelling greatly reduced, milk production about 2/3 normal.

3 PA—i.m. = 3,000,000 units of penicillin G procaine in aqueous suspension, intramuscularly; 3 PO—i.m. = 3,000,000 units of penicillin G procaine in oil, intramuscularly.

TABLE 4—Record of Treatment of Jersey (Case 3)

Date (a.m.)	Time (F.)	Treatment	Results
5/20	10:00	105.0	3 PA—i.m.
5/21	9:00	104.8	3 PA—i.m.
5/22	8:00	104.0	Slightly improved appetite.
5/23	8:00	104.8	Condition unchanged.
5/23	7:00	106.0	Appetite decreased, swelling increased, milk production 5 lb.
5/24	9:30	102.0	Complete anorexia, swelling further increased.
			Ate some grain, slight general improvement.
5/25	11:45	102.8	Appetite improved, swelling receding, milk production 10 lb.
			General improvement, increased appetite and milk production, swelling receding.
5/26	1:00	102.4	Condition same as 5/26.
			Continued improvement.
5/28	10:00	103.2	Acetonemia, anorexia, milk production down.
5/30	10:00	102.6	Chloral hydrate
			Same
5/31	10:00	102.0	General improvement.
6/5	10:00	101.8	Anorexia, stiffness, hypocalcemia.

3 PA—i.m. = 3,000,000 (2 PA, 2,000,000) units of penicillin G procaine in aqueous suspension, intramuscularly; 3 PO—i.m. = 3,000,000 units of penicillin G procaine in oil, intramuscularly; 1 T = 1 Gm. (2 T = 2 Gm.) of terramycin, intravenously.

Condition generally improved by June 6. By June 27, the swelling was completely gone, milk production was 58 lb. daily, and the cow was gaining weight.

Case 7.—On May 6, an 8-year-old, 1,150-lb. Holstein-Friesian, producing 38 lb. of milk daily, was treated with anthrax bacterin. On July 12, she had complete anorexia, slight swelling from shoulder to carpus, marked depression, the feces were

TABLE 5—Record of Treatment of Guernsey (Case 4)

Time Date (a.m.)	Temp. (F.)	Treatment	Results
5/25	9:30 (p.m.)	2 T—i.v.	.....
		3 PO—i.m.	.....
		3 PA—i.m.	.....
		1 PC—i.v.	.....
5/26	8:30	101.2	Respiration almost normal, attitude improved.
		1 T—i.v.	.....
		3 PO—i.m.	.....
5/27	8:00	103.8	Good general improvement, ate some grain, swelling receding, 12 lb. milk.
		1 T—i.v.	.....
		3 PO—i.m.	.....
5/28	8:00	101.2	Appetite normal, swelling receding, production almost normal in 10 days.
		2 PO—i.m.	.....

3 PA—i.m. = 3,000,000 units of penicillin G procaine in aqueous suspension, intramuscularly; 3 PO—i.m. = 3,000,000 units of penicillin G procaine in oil, intramuscularly; 1 T—i.v. = 1 Gm. (2 Gm.) of terramycin, intravenously.

TABLE 7—Record of Treatment of Guernsey (Case 6)

Time Date (a.m.)	Temp. (F.)	Treatment	Results
7/9	9:00	101.2	2 T—i.v.
7/10	9:00	101.8	1 T—i.v.
			Condition fair.
			Appetite normal, swelling and production unchanged.
7/11	8:00	101.6	None
			Good general improvement, reduction of swelling.
7/29	7:00	107.0	2 T—i.v. (p.m.)
			Complete anorexia, no milk, marked swelling, right shoulder to fetlock.
7/30	10:00	104.8	1 T—i.v.
			Appetite improved, otherwise no change.
7/31	9:00	103.2	1 T—i.v.
8/1	9:00	102.2	1 T—i.v.
			General improvement.
			Appetite almost normal, swelling receding and milk increasing.

2 T—i.v. = 2 Gm. (1 Gm.) of terramycin, intravenously.

TABLE 9—Record of Treatment of Holstein-Friesian (Case 8)

Time Date (p.m.)	Temp. (F.)	Treatment	Results
7/16	6:00	106.2	2 T—i.v.
7/17	8:30 (a.m.)	102.8	1 T—i.v.
7/18	8:00 (a.m.)	101.2	1 T—i.v.

2 T—i.v. = 2 Gm. (1 Gm.) of terramycin, intravenously.

The swelling was completely gone in one week.

semiwatery and slightly bloody, and milk production was only 1 lb.

Case 8.—A 7-year-old Holstein-Friesian, weighing 1,150 lb. and producing 45 lb. of milk daily, was treated with anthrax bacterin on May 6. On July 16, she had the following symptoms: complete anorexia,

TABLE 6—Record of Treatment of Holstein-Friesian (Case 5)

Time Date (a.m.)	Temp. (F.)	Treatment	Results
6/27	7:00	106.4	2 T—i.v.
		6 PA—i.m.	.....
		1 PC—i.v.	.....
6/28	8:00	101.8	1 T—i.v.
		6 PA—i.m.	Swelling increased, milk decreased.
6/29	8:00	102.8	1 T—i.v.
		.....	Appetite fair, swelling markedly reduced.
6/30	8:30	101.8	None

3 PA—i.m. = 3,000,000 units of penicillin G procaine in aqueous suspension, intramuscularly; 6 PO—i.m. = 6,000,000 units of penicillin G procaine in oil, intramuscularly; 1 PC—i.v. = 1,000,000 units of penicillin G crystalline, intravenously; 2 T—i.v. = 2 Gm. of terramycin, intravenously.

In two weeks, swelling had subsided and milk production was almost normal.

TABLE 8—Record of Treatment of Holstein-Friesian (Case 7)

Time Date (a.m.)	Temp. (F.)	Treatment	Results
7/12	9:30	102.6	2 T—i.v.
7/13	10:00	105.0	2 T—i.v.
			Condition grave.
			Complete anorexia, no milk, small amount of bloody feces.
7/13	6:30	104.6	1 T—i.v. (p.m.)
			Feces about normal.
7/14	9:00	101.8	5 PA—i.m.
			Starting to eat, producing 2 lb. milk.
7/15	7:00	101.2	5 PA—i.m.
			Appetite improving, swelling receding.
7/16	8:00	101.0	5 PA—i.m.

2 T—i.v. = 2 Gm. (1 Gm.) of terramycin intravenously; 5 PA—i.m. = 5,000,000 units of penicillin G procaine in aqueous suspension, intramuscularly.

One week later, swelling was gone, milk production was almost normal, and the animal was gaining weight.

TABLE 10—Record of Treatment of Draft Gelding (Case 9)

Time Date (a.m.)	Temp. (F.)	Treatment	Results
7/16	11:00	104.8	4 T—i.v.
			First treatment in radial vein, jugular could not be located due to swelling.
7/16	8:00	104.0	2 T—i.v. (p.m.)
7/17	1:30	100.8	1 T—i.v. (p.m.)
7/18	10:45	100.8	1 T—i.v.
7/19	10:00	102.4	1 T—i.v.

4 T—i.v. = 4 Gm. (2 Gm., 1 Gm.) of terramycin, intravenously.

One week later, horse was back at work and swelling was nearly gone.

marked swelling from right shoulder to fetlock, decided lameness, and her milk production was $\frac{1}{2}$ lb.

Case 9.—A 10-year-old, mixed breed,

draft gelding, weighing 1,400 lb., was given anthrax bacterin on May 7. On July 16, he had partial anorexia; extensive swelling (third day) on both sides of the neck, left shoulder and leg, down to middle of the radius, and half of the left thoracic wall; and mechanical lameness. His condition was considered fair.

SUMMARY

Anthrax occurred in thirty days to six months in 3.37 per cent of the cattle and horses vaccinated with commercial bacterins. Some cases failed to respond to, or relapsed under, penicillin therapy. Terramycin® was then used concurrently with penicillin with much better results. Later, terramycin was used alone with equally good, or better, results.

A total of 214 cases were treated—79 with penicillin alone, 73 with penicillin and terramycin, and 62 with terramycin alone. Terramycin alone required the least number of days of treatment per animal. Two animals recovered without treatment.

The author, on the basis of this experience, believes that terramycin used alone gives not only the most rapid, but also the best, results in the treatment of inoculation anthrax.

At the end of 1952, the American chinchilla population was estimated at 251,392. Six per cent of the breeders have 30 per cent of the chinchillas, a minimum of 100 animals each. A pelt sale, with a goal of 10,000 pelts, is planned for 1954.—*Nat. Fur News, Jan., 1954.*

Zoo raccoons are regularly vaccinated for feline and canine distemper. Penguins are difficult to keep in a zoo; they are very susceptible to air sac infection.—*L. E. Fisher, D.V.M., Illinois.*

Feline Enteritis—Not Fox Encephalitis

The following correction should be made in the 1953 "Proceedings Book," page 141, second column, paragraph 5, second line: Instead of "I think they [raccoons] get distemper and fox encephalitis," it should read "I think they get distemper and *feline enteritis*." The raccoon is not susceptible to fox encephalitis. Dr. Gorham made this correction in the Section meeting, but the transcriber failed to pick it up.

Oxytetracycline (Terramycin) as a Therapeutic Agent for Pneumonia Caused by *Brucella Bronchiseptica* in Rats

S. ROSEN, Ph.D.; H. R. HUNT, Ph.D.;
M. A. BENARDE, M.S.

East Lansing, Michigan

In July, 1953, the caries-resistant and caries-susceptible rats developed by Hunt and Hoppert became severely ill with pneumonia. Blood from the nose was observed in nearly every diseased rat and, in some severe cases, rats experienced difficulty in breathing. The colony of about 1,000 rats was reduced to about 750 in two months as 25 to 30 died each week.

Isolations made from the lungs of dead animals indicated that the etiological agent was *Brucella bronchiseptica*. An antibiotic sensitivity test was performed. Streptomycin, chloromycetin®, aureomycin, and terramycin® were effective, whereas penicillin and bacitracin were ineffective.

Streptomycin was given subcutaneously to the sick animals daily until they were well. This treatment temporarily checked the epizootic. Untreated animals constantly became ill and the infection reappeared in many treated animals. The results, therefore, did not warrant the effort of continuous inoculations.

The use of sulfonamides was advised and half the animals were given either sulmet or neoprontisil® in the drinking water. This treatment also was not a cure but it did reduce the death rate.

On the advice of Dr. Charles A. Slanetz of Columbia University, we began to treat the rats with 0.1 per cent of terramycin®* in the feed. All the rats were kept on this treatment for twenty-one days. After two weeks, there was a marked decrease in the death rate. Only 4 rats died during the last week of treatment and the colony seemed normal two weeks after treatment was discontinued. Although it is still feared that the epizootic may recur, the results of therapy with terramycin were highly satisfactory. Six weeks after the last day of therapy, the colony was in good condition.

From the Departments of Bacteriology and Zoology, Michigan State College, East Lansing.

*The terramycin was supplied by Chas. Pfizer & Co., Terre Haute, Ind.

Mesothelioma, An Unusual Equine Tumor

CHARLES H. REID, D.V.M.

Hollywood, California

In August, 1953, I was called to examine a mare which the owner described as "getting fatter but poorer all the time." The animal was an 11-year-old bay mare of the trotting horse type, with a tremendously distended abdomen, suggesting a rupture of the prepubic tendon.

The owner was curious as to when she might have a colt, and it was agreed that she was large enough to have 3 colts. She had raised a colt when she was 4 years old, but had failed to conceive since. An extra-uterine pregnancy in a cystic stage was regarded as a possible diagnosis.

Her breathing was rapid, shallow, and of an intercostal and diaphragmatic nature, her temperature was normal, and no edema was present. She had a good appetite but lacked musculature over the entire body. In fact, had the distention of the abdomen suddenly been removed, it would have revealed a condition almost cachexial in nature. The pulse rate was 75, and all superficial veins were distended; the external thoracic vein, together with its tributaries, appeared inflated. There was a marked jugular pulse on both sides from the chest to the head, easily discernible at a distance of 50 ft. When the head was lowered, the enlargement of the vein was tremendous. Stethoscopic investigation of this jugular pulse revealed a terrific hammering with each wave and the heart sounds included more pulses and murmurs than is easy to explain. Rectal examination disclosed an abdominal tumor situated more or less on the left side of the abdomen in close proximity with the left ovary. There was also a great quantity of fluid in the abdominal cavity. A diagnosis of abdominal tumor with ascites was made.

Treatment was not feasible and she died suddenly about twenty-one days after observation.

At necropsy, it was found that the abdomen contained several gallons of fluid and several tumors, more or less globular in shape, varying in size from a football to an egg, all apparently connected. When strung out on the floor, the mass was about 4 or

5 ft. long with a combined weight estimated at about 200 lb. The necropsy report from the Los Angeles County Livestock Department was "our diagnosis is mesothelioma."

"Diagnosis would have been difficult had we not had excellent clinical and postmortem histories on this case. This is not considered a malignant type of growth although it is fatal. Feldman¹ states:

Available data afford little evidence of metastatic propensities on the part of these tumors. Certain observers claim that they never metastasize; others hold that metastasis does occur. Although a large number of immature cell forms may be present, many of which are undergoing mitosis, the tendency of these cells to enter the blood vascular system or the lymphatics is not comparable to that manifested by many other varieties of malignant growths. It is true that a nearby lymph node occasionally is invaded, and rarely there may be extensive invasion of an adjacent organ, but this is exceptional. The tumors ordinarily remain localized, although frequently multiple growths may be present which do not exhibit malignant aggressiveness comparable to what might be expected from the histologic structure of the mass.

Since multiplicity is one of the commonest characteristics reported, spread within a short radius perhaps occurs, although the exact mechanism of this phenomenon is somewhat obscure. However, it might be explained on the basis of transplantation caused by dissemination of the tumor cells over the surface of the serosa as a consequence of friction, or the multiplicity may be due to the simultaneous origin of new growths at a number of different points.

"Death is usually a result of physical interference with body functions and infections and suppurations which develop within these tumors. Feldman² also states:

Although mesotheliomas undoubtedly are rare, they must occur more frequently in lower animals than is indicated by reported cases. The lack of a uniform nomenclature would suggest that perhaps many of these tumors have been designated as carcinomas, endotheliomas, or as some form of sarcoma, and as a consequence they are difficult to recognize in the literature.

Among the neoplasms in my collection, mesothelial tumors occurred once among 43 tumors of horses, and twice among 230 tumors of cattle."

The author's question is "How many times may we have overlooked such a condition?"

References

¹Feldman, William H.: Neoplasms of Domesticated Animals. W. B. Saunders Company, Philadelphia, (1932): 197.

²Feldman, William H.: Neoplasms of Domesticated Animals. W. B. Saunders Company, Philadelphia, (1932): 195.

Newcastle Disease in Turkeys

Report of a Field Outbreak

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THE SYMPTOMATOLOGY and pathology of Newcastle disease (ND) in turkeys^{7,8} is generally agreed to be similar to that seen in chickens. The purpose of this report is to record a farm outbreak of ND in turkeys characterized by slow spread, mostly in a subclinical form, in several age groups. Respiratory symptoms were not observed in affected birds during the course of the infection. A small percentage of the flock was affected with partial or complete motor paralysis of one or both legs. Since this syndrome of ND had been observed in other flocks in this state, and because there is a paucity of specific reports of ND in turkeys in this country, this field outbreak seemed to merit further consideration.

LITERATURE

According to Stover,¹¹ the first identification of a natural outbreak of a respiratory-nervous disorder in turkeys was made by Hoffman⁹ in 1941. Gasping and spasmodic contractions of the legs were recorded as prominent symptoms in a flock of 6-month-old pouls. One bird which failed to show respiratory symptoms had rhythmic jerking of the legs. Localized gross air sac involvement was also noted in this bird. This is probably the first report of ND in turkeys in this country.

A similar report by Beach¹ was not available for review. Beaudette⁵ stated that Beach¹ found the disease to be less prevalent and less severe in turkeys. The reader is referred to literature compilations of Beaudette^{4,6} for reports of ND in turkeys in other countries.

FLOCK HISTORY

On Aug. 18, 1952, 3 dead Beltsville White pouls, 2 weeks old, were submitted to the diagnostic laboratory for examination. The specimens were reported to be from a group of 200, purchased at 10 days of age from a hatchery in a neighboring state. When they were submitted, approximately 25 pouls had already died and sick birds were frequently found lying on their sides. The gross postmortem findings were scant and variable. Yellowish exudate was noted in the air sacs of 1 bird. The cecums of another poult were distended with frothy contents teeming with trichomonads, while the third poult was negative.

Contribution No. 920 from the Massachusetts Agricultural Experiment Station, University of Massachusetts, Amherst.

Approximately 1,000 other turkeys, ranging in age up to 3½ months, were apparently healthy and they had not shown any earlier evidence of disease. Each of the three breeds raised on the farm, Beltsville White (BW), White Holland (WH), and Broad Breasted Bronze (BBB), were purchased from a different hatchery. Small numbers of chickens, peafowl, pigeons, budgerigars and canaries were kept on the premises.

On August 20, 3 live BW pouls showing marked depression were submitted from the affected group. The lesions were confined to the air sacs. One bird had an accumulation of creamy coagulated exudate in the abdominal and posterior thoracic air sacs, while the greater abdominal air sacs of a second poult had a slightly frothy content. No lesions were noted in the third poult. No respiratory symptoms were evident in this group. Blood serum hemagglutination-inhibition (HI) titers⁹ on these pouls were 40, 80, and 160, respectively.

Additional birds requested for confirmation of a tentative diagnosis of Newcastle disease were not brought to the laboratory until September 24. At that time, 3 older birds, 2 BBB, and 1 WH, were submitted. The owner reported that approximately 75 birds had died in the group first affected before the infection subsided in the early part of September. Other age groups of turkeys appeared normal until September 18, when a bird showing paralysis of the legs was noticed. From that date until September 24, 5 similarly affected birds were removed from pen E and 1 from pen C (see fig. 1).

The most prominent symptom in these older turkeys was a partial or complete motor paralysis of one or both legs (fig. 2). The condition suggested involvement of the lower motor neurons. A severe, fetid diarrhea accompanied the nervous disturbance. No respiratory symptoms were observed. The birds appeared alert and otherwise asymptomatic. The HI titers on blood serum samples from these 3 birds were 640 or greater. The serum-neutralizing (SN) indexes of birds 2 and 3 were $10^{3.5}$ and $>10^{4.5}$, respectively.

On the following day, September 25, the farm was visited to observe the birds and to collect random blood serum samples to determine the spread of infection through the various groups. A diagram (fig. 1) of the farm is presented to show pen relationships, age, and breeds of turkeys housed, original number of birds in each pen, and losses to the time of the farm visit. The originally affected pouls were housed in the brooder house

*These tests were conducted according to procedures recommended by U.S.D.A. Bureau of Animal Industry Circular dated Oct. 21, 1946.

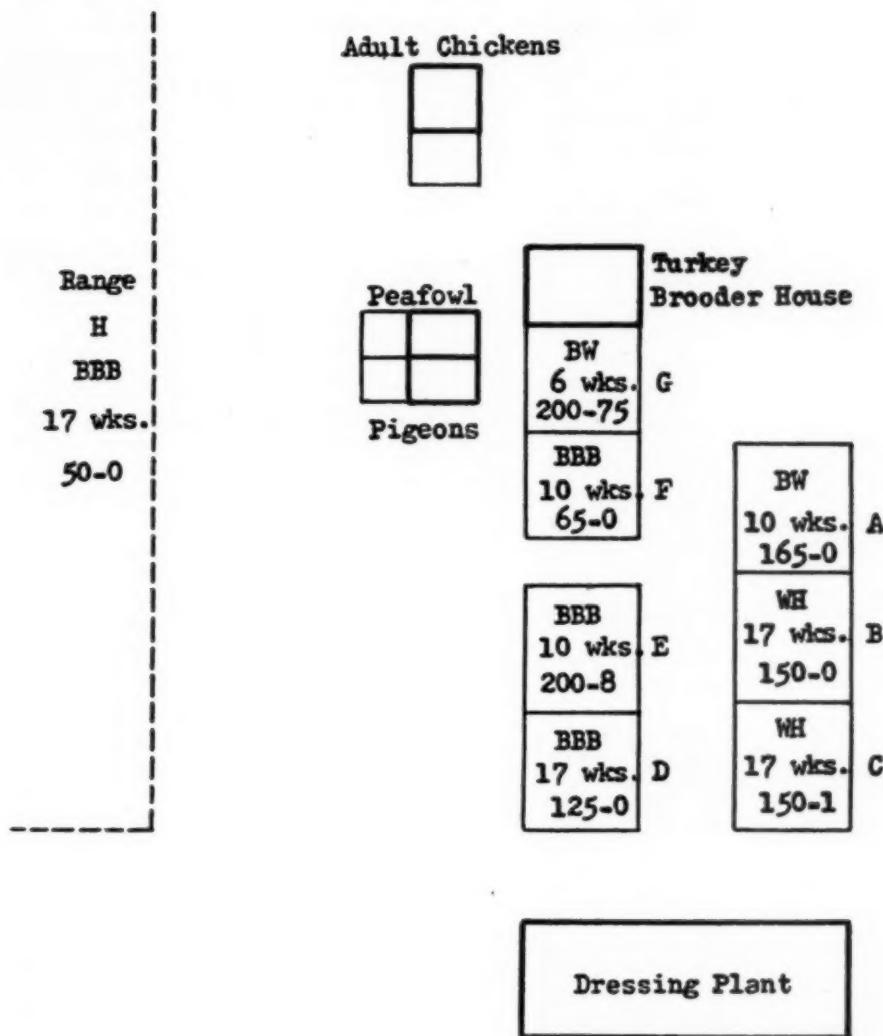


Fig. 1—Diagram of turkey farm showing relationships of housing facilities. The figures refer to the breed and age of the turkeys, the approximate original number per pen, and losses to Sept. 25, 1952. The initially infected poult were housed in the brooder house and in sun porch G. The distance between sun porches is approximately 20 feet.

and sun porch G. Several additional birds were found to be affected similarly to the 3 examined the preceding day. All other birds appeared normal and were generally in excellent condition. The housing was well constructed and sanitation practices of management were superior.

Hemagglutination-inhibition titers of blood serum samples taken from various groups are summarized in table 1.

TABLE 1—Hemagglutination-Inhibition Titer Distribution of Blood Serum Samples Collected at Random on Sept. 25, 1952

Pen (No.)	Bled	HI titer						Ratio of positive titers	
		5	10	20	40	80	160	320	640*
A 9	--	--	2	3	--	--	--	4	4/9
B 9	--	1	1	1	1	--	--	5	6/9
C 15	--	2	7	--	2	--	--	4	6/15
D 12	--	5	7	--	--	--	--	0/12	
E 13	--	--	1	--	--	--	--	12	12/13
F 5	--	--	2	--	--	--	--	3	3/5
G 7	--	--	--	--	--	--	3	4	7/7
H 5	--	1	4	--	--	--	--	0/5	
J 4	1	2	1	--	--	--	--	0/4	

*Due to the fact that the virus titer was 640, the readings in this column may not have been carried to an end point.

Blood serum samples were obtained for ND serum-neutralization tests from a few birds in three pens. Positive SN indexes correlated closely with positive HI titers. The results of these tests are compared in table 2.

Virus isolation attempts* were made from tissues of 2 affected BBB turkeys selected during the farm visit. Individual tissue suspensions of brain, lung, spleen, liver, and blood from these birds failed to yield the ND virus on two passages in 10-day-old

*We are grateful to Dr. S. B. Hitchner, American Scientific Laboratories, Madison, Wis., for conducting the virus isolation attempts and SN tests on these birds.

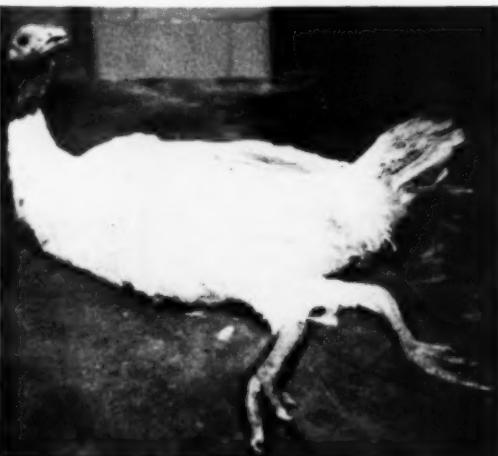


Fig. 2—Bird 3 showing bilateral motor paralysis of legs. Note the alert condition of the bird.

TABLE 2—Comparison of Serum-Neutralization Indexes and Serum Hemagglutination-Inhibition Titers of Birds Selected Randomly in Three Pens

Pen and bird (No.)	Serum- neutralizing index	Serum hemagglu- tination-inhibition titer**
C — 1	<10 ^{0.8}	10
C — 2	10 ^{1.1}	640
C — 3	10 ^{1.0}	640
C — 4	10 ^{1.2}	640
C — 5	<10 ^{0.8}	10
D — 1	<10 ^{0.8}	20
D — 2	<10 ^{0.8}	20
D — 3	<10 ^{0.8}	10
D — 4	0	10
D — 5	<10 ^{0.8}	10
E — 1	10 ^{1.2}	640
E — 2	10 ^{1.5}	640
E — 3	10 ^{1.2}	640
E — 4	<10 ^{0.8}	640

*The SN index of E-4 was not carried to an end point due to lack of serum.

**This titer may not represent end points due to the fact the virus titer was 640.

embryos inoculated via the allantoic sac route. The ND serum-neutralization titers on these 2 birds (4 and 5) were 10^{4.5}.

The ND-susceptible birds on range H were vaccinated by the wing-web method on September 26. During the following month, 16 paralyzed birds were observed on this range. On a subsequent farm visit, October 13, 2 BBB turkeys were obtained from this range. Bird 6 appeared involved similar to the preceding 5 birds examined, while bird 7 showed evidence of involvement of the higher centers of the central nervous system (CNS). An unsteadiness of the head, unequal pupillary dilation, and a wobbly gait were noted in the latter bird. No respiratory symptoms were detected in either bird. An attempt to isolate ND virus from spleen, lung, and brain tissue suspensions of bird 7, inoculated into embryonating eggs as previously mentioned, failed. Birds on range J, vaccinated after October 13, had not developed any detectable nervous symptoms at marketing time.

Losses which occurred in various pens during the course of this infection are indicated in table 3. The breed and age, together with the original num-

TABLE 3—Data on Losses in Various Pens

Pen	Birds per pen	Age	Breed	Losses 9/25/52*	Losses after 9/25/52**
A	165	10 wk.	BW	0	5
B	150	17 wk.	WH	0	4
C	150	17 wk.	WH	1	5
D	200	17 wk.	BBB	0	8
E	125	10 wk.	BBB	8	7
F	65	10 wk.	BBB	0	4
G	200	6 wk.	BW	75	0
H	50	17 wk.	BBB	0	16
J	75	17 wk.	BBB	0	0

*The farm was first visited on this date.

**With the exception of range H, these losses which represent paralyzed birds occurred in a three-week period after Sept. 25, 1952. There were no losses on range H prior to ND vaccination.

ber of turkeys in each pen prior to the outbreak, are shown.

PATHOLOGY

Most of the birds examined presented no significant gross lesions. Hemorrhage discolored the gray matter of the thoracic spinal cord in bird 2. Slight turbidity was noted in the greater abdominal air sacs of bird 4. An apparent increase in cerebrospinal fluid was noticed in the subdural space of most birds.

The microscopic findings of the various tissues taken from 7 birds (WH and BBB) with CNS disturbance follow:

Central Nervous System.—**Brain.**—While all general regions were involved in the composite tissue sampling, the corpus striatum and the brain stem were the most consistently affected areas. Mild gliosis arranged in small, loose foci formed the major part of the reaction pattern. Perivascular nodules, though not characterized by dense cuffings, were occasionally present.

Extensive involvement of the dorsum of the brain was present in 1 bird. The anterior and posterior choroid plexuses were moderately infiltrated with mononuclear cell types. A cerebellar folium adjacent to the posterior plexus was similarly involved. Neuron cell body degeneration, accompanied by neuronophagia, was a prominent finding in the neopallium, corpus striatum, and mesencephalic nuclei of this bird.

Spinal Cord.—The gray matter was involved almost exclusively in sections taken at the cervical, thoracic, and lumbar levels. Glia cell mobilization appeared to have a discontinuous distribution along the length of the spinal cord. The most intense reactions were seen in the ventral gray horns of the lumbar cord. An unequal degree of bilateral involvement was frequently noted. Perivascular infiltrations, which were more conspicuous than in the brain, coexisted with gliosis. Hyperplasia of blood vessel endothelium was occasionally noted. Ventral motor cell bodies often appeared essentially normal with moderate gliosis in the immediate vicinity. Degenerative changes were not generally accompanied by satellitosis. Hemorrhage at the junction of the gray matter myelin in the thoracic cord almost completely obliterated the ventral horn in one section.

Respiratory System.—**Trachea.**—The mucosae were essentially normal except for a mild vacuolar appearance of the glands.

Lungs.—There was a noticeable variation in the quantity of lymphoid tissue. Small numbers of lymphocytic foci were distributed in the bronchial mucosae, among the vestibular trusses of the tertiary bronchi, and related to the larger blood vessels.

Air Sacs.—The posterior air sac membranes from 2 birds revealed a few discrete lymphocytic foci which were accompanied in 1 bird by small granulomatous foci with necrotic cores.

Abdominal Viscera.—**Liver.**—An inconstant find-

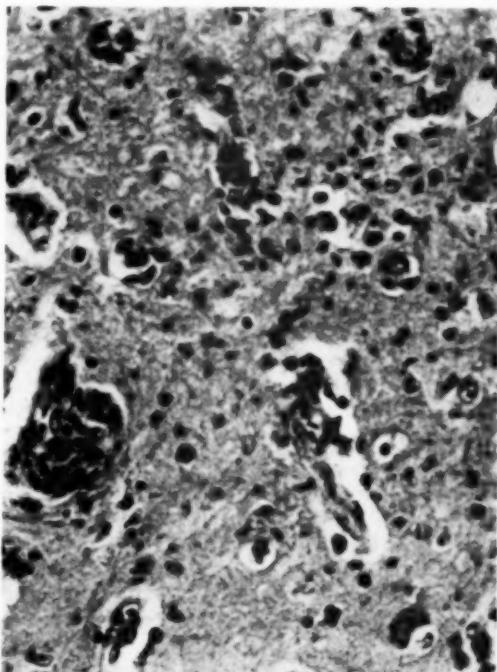


Fig. 3—Gliosis and perivascular nodules in the cerebrum, x 360.

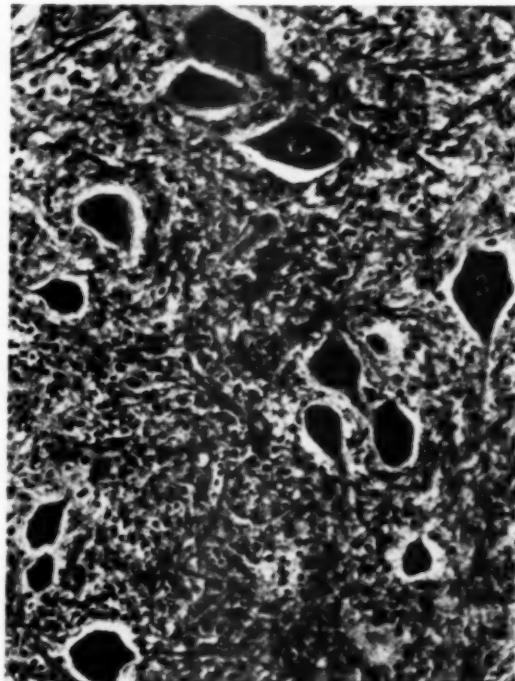


Fig. 4—Ventral gray horn of the lumbar spinal cord showing gliosis, x 145.

ing was subendothelial edema of the hepatic sinusoids.

Spleen.—Subcapsular hemorrhage was noted in three sections.

Kidney.—Swollen glomeruli, with adhesions and thickening of Bowman's capsule, were occasionally noted. Tubular degeneration was apparent in a single bird.

Other organs examined, which were considered essentially normal, were the pancreas, proventriculus, duodenum, adrenals, and gonads.

DISCUSSION

The diagnosis of Newcastle disease in this outbreak was made largely on the basis of positive hemagglutination-inhibition and serum-neutralization titers in blood serum samples of a relatively large number of unvaccinated birds (table 1). The microscopic findings were of value as confirmatory evidence.

Virus isolation attempts did not yield ND virus in two embryo passages of each tissue suspension made from 3 affected BBB turkeys. Since birds 4 and 5 had an SN index of $>10^{4.5}$ and the HI titer of bird 7 was 1,280, it is suggested that the failure of virus isolation may be explained by the absence of the virus in highly immune birds. This failure may be similar to the experience of Beach² in the difficulty of transmission with tissues from older birds.

The flock history indicates, from an epizootiological viewpoint, that ND was probably introduced on the premise in 10-day-old pouls. This was substantiated by correspondence with Dr. J. D. Winn of the Department of Animal Diseases at the University of Connecticut. His records showed that a diagnosis of ND was made on August 8 in pouls reared on the hatchery farm from which the infected stock of our report was obtained. The losses were considerable (75 out of 200) in pen G after introduction of the disease on the farm.

Clinical evidence of the infection spreading to other pens was not noted by the owner for approximately four weeks. The HI titers of blood serum samples taken from birds in various pens on September 25 demonstrated that the infection was still disseminating when the blood samples were collected.

At that time, birds in pens nearest the originally infected BW pouls possessed generally higher and more uniform HI

titors. No explanation was found for the earlier development of more clinically sick birds, 10-week-old BBB, in pen E as compared to a similar age group of birds in pen F. It is possible these birds had been infected when they were separated three weeks previously. Pen A held BW, 10 weeks old, from the same hatchery as the originally infected pouls in pen G. No clinically affected birds were noted in this group to the time the blood samples were obtained. Although blood samples from other species of birds (chickens, pigeons, peafowl, budgerigars, and canaries) housed on the farm were not obtained, no losses or clinical symptoms were noted in these species to the time ND vaccination was initiated.

One of the most distinctive features of the outbreak was the absence of symptoms in most of the birds. With the exception of those originally infected in pen G, symptoms were noted in less than 1 per cent of the flock for the four-week period preceding the farm visit. Emphasis should be placed on the lack of noticeable respiratory symptoms in the clinically affected birds, and the fact that the older birds which came to our attention were not visibly depressed. Motor paralysis of one or both legs was the only significant symptom noted.

The lesions were almost entirely of microscopic proportions. Focal gliosis, as the most prominent finding, was similar to the description of the experimental disease by Jungherr.¹⁰ The sparse evidence of neuronal degeneration and conspicuous absence of neuronophagia for the most part suggested that the motor paralysis in some birds may have been transient or reversible. Our experience in the limited time that birds were held did not substantiate this point. Although microscopic brain lesions were present in all paralyzed birds which were examined postmortem, apparently the mild form or the widely disseminated pattern did not provoke clinical manifestations.

The lack of tracheal râles in examined birds was substantiated by essentially normal mucosal histology. Lymphocytic hyperplasia of the lungs was not regarded as specific for ND. The granulomatous foci in the air sacs suggested a mild infection of the lower respiratory tract with the agents of infectious sinusitis or chron-

ic respiratory disease. No evidence of a concomitant clinical infection was noted, however, during the period the flock was observed. Since lesions of the abdominal viscera were not consistently found, emphasis could not be placed on their significance.

SUMMARY

An outbreak of Newcastle disease in turkeys, which spread largely in a subclinical form in various age groups, is described. Blood serum samples taken from these groups, approximately five weeks after the infection started, demonstrated a considerable variation in status of ND immunity.

Partial or complete motor paralysis of one or both legs was the only constant symptom noted. Respiratory symptoms were not noted in affected birds. Emphasis should be placed on the fact that a similar syndrome of ND has been observed in other turkey flocks by the authors.

Pathological alterations were essentially microscopic. Focal gliosis, occasionally accompanied by mild perivascular cuffings in the brain and spinal cord, formed the basis of the reaction pattern to ND.

References

- ¹Beach, J. R.: A Respiratory Nervous Disorder in Chickens. California Cultivator, 89, (1942): 504-511.
- ²Beach, J. R.: Avian Pneumoencephalitis. Proc. 46th Ann. Meet., U.S. Livestock San. A. (1942): 203-223.
- ³Beach, J. R.: Pneumoencephalitis in Poultry. Nulaid News, 26, (1948): 9-10.
- ⁴Beaudette, F. R.: A Review of the Literature of Newcastle Disease. Proc. 47th Ann. Meet., U.S. Livestock San. A. (1943): 122-177.
- ⁵Beaudette, F. R.: An Addendum to a Review of the Literature on Newcastle Disease. Proc. 53rd Ann. Meet., U.S. Livestock San. A. (1949): 202-220.
- ⁶Beaudette, F. R.: Current Literature on Newcastle Disease. Proc. 55th Ann. Meet., U.S. Livestock San. A. (1951): 108-174.
- ⁷Brandly, C. A.: Chapter on Newcastle Disease in "Diseases of Poultry," by Biester and Schwarte. 3rd ed. Iowa State College Press, Ames, Iowa (1952): 531-568.
- ⁸Hinshaw, W. R.: Chapter on Diseases of the Turkey in "Diseases of Poultry" by Biester and Schwarte. 3rd ed. Iowa State College Press, Ames, Iowa (1952): 1142.
- ⁹Hoffman, H. A.: Respiratory Nervous Disorder in Adult Turkeys. Monthly Bull., California State Dept. Agric., 31, (1942): 130-133.
- ¹⁰Jungherr, E. L.: The Pathology of Experimental

Avian Pneumoencephalitis. Am. J. Vet. Res., 5, (1944): 125-134.

¹¹Stover, D. E.: A Respiratory-Nervous Disorder of Chickens and Turkeys. Monthly Bull., California State Dept. Agric., 32, (1943): 31-38.

Cases of Tuberculosis with No Visible Lesions

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The phrase "increased percentage of no visible lesions" may have two very different meanings. It may be used to designate an increase in the percentage of reactors that show no visible lesions, or it may be used to designate an increase in the percentage of the animals tested that show no visible lesions.

For example, an area might have 1,000 cattle tested on two successive tests. The first test might reveal 100 reactors with 10 (10%) showing no visible lesions. The later test might reveal only 50 reactors again with 10 (20%) showing no visible lesions. However, while the percentage of reactors with no visible lesions was doubled in the second test, the percentage of cattle tested which revealed no visible lesions remained at 1 per cent.

If more care were taken in defining which percentage is meant, less confusion would result in the discussion of cases with no visible lesions.

As an example of such confusion, we quote from the Report of the Committee on Tuberculosis, "Proceedings of the United States Livestock Sanitary Association" for the year 1950, page 130.

We have one problem, the matter of no visible lesion cases, which seems to be on the increase over the entire country. . . . This, however, must be expected as it seems to be an accepted fact that the percentage of no visible lesions rises as the percentage of infection is reduced.

These statements are misleading. They do not mean that there were more no-visible-lesion reactors in the country; they mean only that there were more among the reactors.

Dr. A. K. Kuttler (on page 122 of the same publication) states:

There has been very little change in the percentage of tuberculous animals reported for the entire country during the past eight years, in

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fact it will be slightly higher in 1950 than in 1943. Prior to that time, there was an almost unbroken decrease in the percentage of infection since the inception of the project in 1917. There were 9,439,811 cattle tuberculin tested during the fiscal year ending June 30, 1950, with 17,733 or 0.19 per cent reactors.

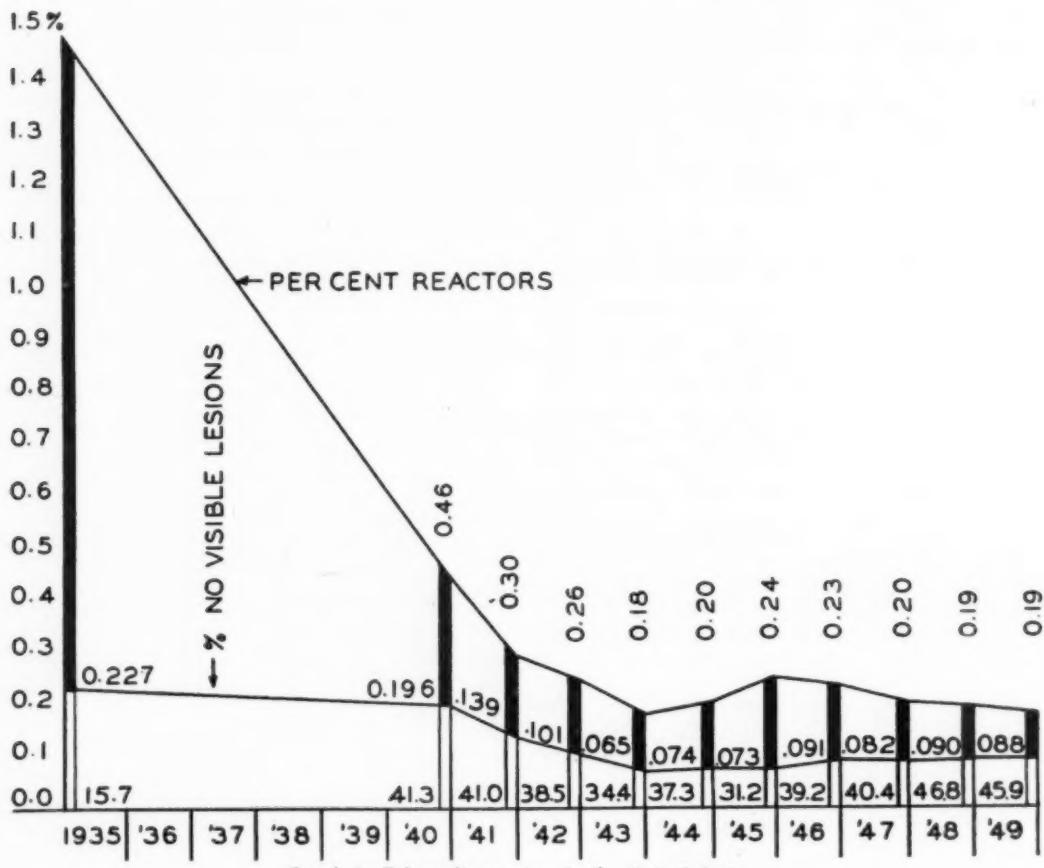
In this case, with 0.19 per cent reacting, even if the percentage of reactors that show no visible lesions would rise to 50 per cent or higher, only about 0.1 per cent of the number tested would be reactors with no visible lesions.

Graph 1 has been constructed from actual test data over a fourteen-year period, as reported by Dr. Asa Winter in the "Proceedings of the United States Livestock Sanitary Association" at Columbus in 1949 (p. 83). The percentages shown are based on the total number of animals tested in the United States for each year.

This graph reveals that while the percentage of reactors that showed no visible lesions had risen from 15.7 per cent on the

first test in 1935, to 45.9 per cent on the final test in 1949, the actual number of cases with no visible lesions had dropped, in the same period, from 57,491 or 0.227 per cent of the animals tested in 1935, to 7,708 (0.088%) in 1949. The slight increase in both total reactors and cases with no visible lesions that occurred in 1944 and 1945 might be attributed to the effect of the war on the number of veterinarians available for testing, to less interest in testing on the part of owners of cattle, to shortage of farm labor, or to higher prices, which made the indemnities less attractive. The ratio of reactors to animals tested was 1:67 in 1935 and 1:514 in 1949.

The program for locating centers of infection through tracing infected animals, found on postmortem meat inspection, back to the farm or ranch of origin, as suggested by Dr. A. K. Kuttler, should aid the area testing program in further reducing the incidence of infection.



Graph 1—Tuberculin reactors in the United States.

CONCLUSIONS

1) As long as the number of reactors found on each succeeding bovine tuberculin test of the same area diminishes, the percentage of these reactors which show no visible lesions will probably increase, but this will not indicate an increase in the number of cases with no visible lesions.

2) There is no evidence that cases with no visible lesions are on the increase over the entire country; on the contrary, there has been a decrease both in cases with lesions and those with no visible lesions.

Bovine Tuberculosis in Britain

In Great Britain, tuberculosis was estimated as affecting 40 per cent of the cows in 1931; about 18 per cent of all cattle (30 per cent of cows) in 1949; and perhaps 10 or 12 per cent of all cattle in 1952. The Attested Herds Scheme for the voluntary eradication of tuberculosis was inaugurated in 1935. By June, 1950, only one fifth of the cattle were in attested herds so the plan was revised to provide a bonus to encourage other herd owners to join. Later in 1950, the Scheme was expanded to include an area-eradication plan. By September, 1952, 37.5 per cent of the cattle were in attested herds, and two areas, one each in Scotland and Wales, and three small islands were free of tuberculosis. A similar attested herd scheme was introduced in North Ireland in 1949.

The tuberculin used in testing is a purified protein derivative (P.P.D.) in which the tuberculoprotein content is constant. It is used simultaneously with an avian tuberculin as separate intradermic injections in the skin of the neck. The thickness of the skin is measured with calipers before injection, and again seventy-two hours later, to check the reaction. The double injection is to differentiate true bovine tuberculosis from sensitization due to related infections. The interpretation and disposition of cases is as follows:

1) If negative to mammalian tuberculin, regardless of the avian reaction—retained; (2) if doubtful to mammalian tuberculin—retested; (3) if positive or doubtful to both tuberculins but the skin measurement of the mammalian reaction is not more than 4 mm. greater than to the avian—retained if nonspecific infection is established, retested if not; (4) if positive to mammalian tuber-

culin, or both, but the reaction does not exceed that with the avian by 6 mm.—retested if non-specific infection is established, removed if not; (5) if positive to mammalian tuberculin and the reaction is more than 6 mm. greater than to the avian—removed.

An interval of more than a month should be allowed before retesting. False tuberculin reactions are most troublesome during the final steps of eradication. BCG or other vaccination methods have no place in the eradication scheme.—*WHO-FAO Seminar on Zoönoses, Vienna, Nov., 1952.*

Bovine Tuberculosis and Man

One series of 5,500 tuberculous patients in Denmark is reported, in which occasionally a mixture of both bovine and human types of bacillus or an atypical strain was found, although infection was usually due to either the human or bovine type. Alimentary infection was usually due to the bovine type, and infection by inhalation, while usually due to the human type, also occasionally was caused by the bovine type. The latter occurred chiefly in persons working with tuberculous cattle. While infection with the bovine type was generally more benign, in infants it sometimes developed as a meningitis or as a cervical adenitis.

In one Danish county, when the incidence of bovine tuberculosis was high, 50 per cent of the children 7 years of age, and 75 per cent at 14 years, were positive to the tuberculin test. Actually, persons working with infected cattle may be in greater danger of developing pulmonary tuberculosis than persons working in a well-regulated tuberculosis hospital. Since the above incidents, an energetic campaign has completely eradicated tuberculosis in the cattle of Denmark.

Infection of the human type in cattle may cause them to react temporarily to the tuberculin test, but it rarely produces progressive tuberculosis. Furthermore, it is seldom, if ever, re-transmitted to man. However, in 17 Danish herds, where the infection had apparently been transmitted from man to cattle, the suspected men in every case were infected with pulmonary tuberculosis of the bovine type.—*WHO-FAO Seminar on Zoönoses, Vienna, Nov., 1952.*

Field Results with Huddleson's Brucella M Vaccine in Fourteen Illinois Herds

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THE REPORT of Huddleson and Bennett¹ of the vaccinal immunizing value of a mucoid growth phase of *Brucella suis* against brucellosis in cattle created widespread interest. In 1948, controlled experiments and field observations on Huddleson's vaccine were initiated in Illinois.*

Results on use of the vaccine in adult pregnant and nonpregnant cattle in 25 recently infected, privately owned herds in Michigan were reported.² In the 25 herds at the beginning of the study there were 775 negative, 158 suspicious, and 197 positive animals of or near breeding age. All were injected with the vaccine. After twelve to fourteen months of observation and study, 3 per cent of the negative and 17 per cent of the suspicious reactors were positive to the blood test. Of the suspicious reactors, 39 per cent became negative to the blood test. Ten per cent of the reactors became negative during the observation. There were 33 abortions in the negative group, 6 in the suspicious, and 34 in the positive group. None of the 23 fetuses examined bacteriologically showed the presence of the vaccine-type of organisms or *Br. suis*, but *Brucella abortus* was isolated in 10 instances.

The milk samples from vaccinated animals were negative for the vaccine-type of organisms.

Injection of the vaccine had no noticeable effect on the fertility of the animals. Milk production was slightly reduced for twenty-four hours.

Following injection of the vaccine, the agglutination titers of negative animals did not rise above 1:100. They were again negative in ninety days

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Dr. M. E. Mansfield helped keep the records during the initial observations. These observations were made possible by a grant from the cooperating herd owners.

*This resulted from the cooperative action of Drs. B. T. Simms, chief of the U. S. Bureau of Animal Industry; I. Forest Huddleson, of Michigan State College; Roy A. Thompson, then superintendent of the Illinois State Department of Agriculture, Division of Livestock Industry; Dean Robert Graham, of the University of Illinois College of Veterinary Medicine; and interested herd owners and their veterinarians. Dr. E. A. Woelffer, extension veterinarian (now located at Oconomowoc, Wis.), and Mr. C. S. Rhode, extension dairyman, at the University of Illinois, helped organize the plan for field study of the vaccine in the initial cooperator herds. The results of the controlled experiments were reported by Dr. H. S. Bryan at the U. S. Livestock Sanitary Association, September, 1953, at Atlantic City, N. J.

The cooperation of the herd owners, herdsmen, and the following practitioners is acknowledged with sincere appreciation: Drs. F. E. Connor, J. T. Foley, William J. Gay, J. W. Heger, H. G. Hoyt, G. W. Jensen, J. H. McCaslin, James H. Moser, R. J. Nuthall, J. P. Ostrander, C. P. Tossey, H. P. Wessels, and Olin G. Wheaton.

unless they became infected with the strain of *Brucella* present in the herd. As a rule, the number of animals that became infected after vaccination appeared to depend on the number of pregnant animals that received herd exposure to brucellosis before vaccination. The injection of the vaccine into such animals did not prevent them from becoming infected or aborting.

From the limited use of the vaccine in infected animals, little or no evidence was obtained to indicate that M vaccine prevented abortion or caused a positive blood reaction to become negative.

Killham, Reed, and Clark³ reported field experiences with *Brucella M* vaccine in 117 herds and 2,402 cattle as compared to an unvaccinated group made up of 311 herds containing 2,927 cattle. The results of the postvaccination blood test showed a lower incidence of brucellosis in the vaccinated group. A few problem herds were encountered in each group. A report of the results of *Brucella M* vaccine in these problem herds would be of value, since the problem herd is frequently encountered in control of bovine brucellosis under field conditions.

Clark⁴ reported that *Brucella M* vaccine did not produce persistent blood agglutination reactions or possess therapeutic value.

Huddleson⁵ reported the results of controlled experiments on adult animals in four privately owned herds. The results in each herd were best in those animals receiving *Brucella M* vaccine.

Clark⁶ reported a tabulation of replies from 114 Michigan practitioners who used *Brucella M* vaccine in 50,943 cattle in 3,976 herds. Brucellosis was not checked in 202 herds (5.08%).

Stern⁷ reported on the use of 6,100 doses of *Brucella M* vaccine in 160 herds. He did not obtain as good immunity in 6 per cent of the herds as anticipated.

MATERIALS AND METHODS

Brucella M vaccine was developed in the *Brucella* Laboratory at the Michigan State College. The vaccine is a suspension of live and dead bacterial cells of two of the mucoid growth phases of *Br. suis*. The growth of these two phases on agar culture medium is mucus-like in consistency, from which the term "mucoid" is derived.

Live bacterial cells of these two growth phases of *Br. suis* do not produce a progressive disease or establish themselves in the tissues of the guinea pig or cow. They have never been recovered from the milk of a lactating cow or an aborted fetus following subcutaneous injection.

The immunizing activity of the vaccine is based on the enzyme content of the bacterial cells and the dose is determined from the dry weight of a given

cell suspension. The dose of vaccine is 1 cc. for all animals. Each cubic centimeter contains 4.3 to 5.0 mg. of bacterial cells (dry weight).²

The vaccine used in the Illinois field trials was furnished by the Michigan State College Brucella Laboratory. All pre- and postvaccinal collection of blood samples was done by the practitioners. All vaccinated animals received a 1-cc. dose of Huddleson's mucoid vaccine, injected in the postscapular region. All experimental animals were blood tested before, and at varying times after, vaccination. Blood samples were tested at the Pathology Laboratory of the University of Illinois, College of Veterinary Medicine.

In the herds receiving M vaccine, calfhood vaccination with strain 19 had been employed and in one herd some adult vaccination with BAI strain 19 was carried out. In this herd, reactor and suspect animals were vaccinated. In another herd, a small number of immature and mature bulls were injected. No routine, postvaccinal, bacteriological examinations were included in the plan for field observations. Herd owners and veterinarians were urged to submit aborted fetuses to the laboratory for examination.

Milk samples from 10 lactating cows injected with M vaccine were examined bacteriologically for the presence of Brucella at twenty-six and thirty-five days after vaccination, with negative results. Semen from 3 bulls that had been injected with M vaccine was examined bacteriologically for the presence of Brucella at six and twenty-one days after vaccination, with negative results. Most of the herds included in the observation were closed herds, but adult cows were added to some herds. Animals varying in age from 4 months to 17 years, and in all stages of gestation, were vaccinated with M vaccine.

RESULTS

A summary of blood test results in 14 herds following vaccination with 1 cc. of

TABLE 1—Illinois Cooperative Brucellosis Experiment
42, Summary of Field Observations, Huddleson's
Mucoid Vaccine (1948-1953)

Herd (No.)	vacci- nated	Pre-vaccination test			Last postvaccination test		
		Neg.	React.	Susp.	Neg.	React.	Susp.
1	78	64	6	8	66	6	6
2	47	40	3	4	32	5	10
3	191	164	8	19	155	14	22
4	240	204	8	28	202	7	31
5	117	96	10	11	108	9	0
6	451	449	0	2	450	0	1
7	119	86	14	19	68	27	24
8	47	36	5	6	36	4	7
9	52	50	0	2	52	0	0
10	120	96	11	13	93	14	13
11	65	65	0	0	65	0	0
12	82	80	1	1	79	1	2
13	29	27	1	1	22	3	4
14	58	51	5	2	52	5	1
Totals	1,696	1,508	72	116	1,480	95	121
Per cent		(88.9)	(4.2)	(6.8)	(87.3)	(5.6)	(7.1)

Huddleson's Brucella M vaccine is given in table 1.

No therapeutic value of Huddleson's vaccine was demonstrated. Vaccination of lactating animals resulted in some reductions of milk flow, but practitioners did not report serious postvaccinal reaction. Several adults, however, were sensitized to Brucella due to previous calfhood vaccination with strain 19. No trend regarding the effect of M vaccine on reproduction was observed.

Revaccination with Huddleson's Mucoid Vaccine.—In the "Instructions for Use of Brucella M Vaccine" issued by the Brucella Laboratory, Michigan State College, July, 1950, it is stated that "If conditions in a herd warrant it, animals should be vaccinated at the end of two years." The blood test results on 458 animals which were revaccinated are summarized in table 2.

TABLE 2—Illinois Cooperative Brucellosis Experiment
42, Summary of Field Observations, Huddleson's
Mucoid Vaccine (Revaccination) 1950-1953

Herd (No.)	revacci- nated	Number			Last post- vaccination test		
		Neg.	React.	Susp.	Neg.	React.	Susp.
1	18	14	0	4	15	0	3
2	6	5	0	1	5	0	1
3	62	36	12	14	35	9	18
4	93	88	1	4	79	6	8
6	279	274	0	5	266	0	13*
Totals	458	417	13	28	400	15	43
Per cent		(91.0)	(2.8)	(6.1)	(87.3)	(3.3)	(9.4)

*Within ninety days following revaccination.

In herd 3, adult vaccination of some animals with strain 19 had been practiced. Prior to revaccination, herd 4 was progressing satisfactorily in the control of brucellosis, but soon afterward, 5 animals became infected, 2 of which were heifers that aborted at five and one-half months. These heifers received their first dose of Huddleson's vaccine when they were 8 and 12 months of age.

A persistent blood-agglutination titer from revaccination was not a problem. In one herd, some indurated areas of swelling persisted for several weeks at the site of the injection. Bacteriological examination of the vaccine used did not show the presence of any contaminants.

DISCUSSION

The totals listed for each farm are not to be interpreted as the brucellosis status of the herd at the time the results of the observation were summarized (June, 1953).

In several infected herds, the brucellosis status had improved due to the disposal of infected animals. In only one herd was the test-and-slaughter method used in conjunction with M vaccine. If cattle injected with M vaccine were sold or died during the period of observation, their last recorded blood test was included in the final tabulation. Huddleson⁶ has recommended that M vaccination be used in conjunction with the other approved methods for combating brucellosis. The retention of reactors in most of the herds, however, probably served as a challenge exposure to the vaccinated animals.

The progress of brucellosis in herd 7 (table 1) continued after vaccination, accompanied by an appreciable number of abortions. Two bulls, 2 and 6 years of age, negative when vaccinated, became reactors and were slaughtered. The herd was later dispersed. Some adult vaccination had been practiced in herd 3 (table 2). Herd 9 (table 1) had been free from the disease many years. Most of the herds included in the observation reported here have resumed calfhood vaccination with strain 19, since infection occurred in a disturbing number of first-calf, M-vaccinated heifers in infected herds.

Huddleson¹ states that experience has shown that it is next to impossible to evaluate the protective action of a vaccine in animals in privately owned herds where the disease has been present for one year or more. This is because only a slightly higher percentage, if any, of the negative unvaccinated controls become infected during the observation. No controls were provided in the privately owned herds reported in this observation.

Huddleson¹ has stated further that a partial answer to the question of how many reacting and suspicious reacting animals normally revert to a negative status was obtained several years ago in a study of the trend of the serum-agglutination titers of animals in a large dairy herd. In his total of 189 showing an agglutination titer of 1:100 or higher, and of 85 showing a positive reaction in dilutions less than 1:100, 8 per cent and 31 per cent, respectively, reverted to a negative status during a four-to-six-year period.

According to Mingle⁷ about 10 to 12 per cent of Brucella-infected cattle will recover spontaneously from the disease. This is an

over-all figure which can not be predicted for the variety of conditions in the field and has to be ignored from a control point of view.

The influence of previous calfhood vaccination with strain 19 in appraising the tabulated data is recognized. Thompson⁸ reported field data assembled in New York State which showed that 8.5 per cent of the cows vaccinated as calves, and exposed to brucellosis, would be reactors at the age of 2 to 3 years. Of the reactors, 3.5 per cent would be due to the vaccination with strain 19. The above observation serves to stress the point that an evaluation of field results with Brucella vaccines, without controls, must include serious consideration of the natural course of brucellosis.

The possible value of Huddleson's mucoid vaccine for use as a type of booster immunization for brucellosis in adult cows can be answered only by controlled experiments. It appears that more research is needed on the immunizing value of such relatively nonagglutinogenic vaccines for bovine brucellosis.

SUMMARY

1) Huddleson's mucoid vaccine, 1-cc. doses injected subcutaneously in 1,696 cattle in Illinois, did not result in a persistent agglutination titer. Only rarely did the titer last ninety days in the herds included in these studies. Vaccination of animals of all ages and in all stages of gestation apparently was not harmful.

2) Results of prevaccination blood tests during a five-year period showed 89.0 per cent negative, 4.2 per cent reactors, and 6.8 per cent suspects. The last postvaccination blood tests showed 87.3 per cent negative, 5.6 per cent reactors, and 7.1 per cent suspects.

3) Revaccination of 458 animals two years or more after the first dose of M vaccine was confined to five herds. Results, during a three-year period, of blood tests taken before revaccination showed 91.0 per cent negative, 2.8 per cent reactors, and 6.1 per cent suspicious. The results of the last postvaccination blood tests showed 87.0 per cent negative, 3.3 per cent reactors, and 9.4 per cent suspects.

4) In six infected herds receiving M vaccine, some negative animals developed brucellosis, as judged by the results of the serum-agglutination test.

5) In one herd that was revaccinated

with M vaccine, 5 animals soon developed brucellosis, as judged by the results of the serum-agglutination test.

References

¹Huddleson, I. Forest, and Bennett, G. R.: The Vaccinal Immunizing Value of a Mucoid-Growth Phase of *Brucella suis* Against Brucellosis in Cattle. Michigan Agric. Exper. Sta. Quart. Bull., 31, (1950): 139-156.

²The Brucella Laboratory, Michigan State College: Instructions for Use of Brucella (M) Vaccine for the Immunization of Cattle Against Brucellosis. East Lansing, Mich., July, 1950.

³Killham, B. J., Reed, G. W., and Clark, C. F.: Field Experiences with Brucella (M) Vaccine. Proc. 53rd Ann. Meet. U. S. Livestock San. A. (1949): 25-28.

⁴Clark, C. F.: Observations on the Use of Brucella (M) Vaccine. Proc. 53rd Ann. Meet. U. S. Livestock San. A. (1949): 29-35.

⁵Huddleson, I. Forest: Further Observations on the Immunizing Value of Brucella M Vaccine Against Brucellosis. J.A.V.M.A., 116, (1950): 50-51.

⁶Clark, C. F., and Sterner, E. F.: The Use of Brucella M Vaccine in Michigan. Proceedings Book, AVMA, (1951): 50.

⁷Mingle, C. K.: Correlation of Research with Brucellosis Control. Vet. Med., 42, (1948): 255-260.

⁸Thompson, William M.: A Study of Blood Test for Brucellosis Grouped According to the Age of the Animal. J.A.V.M.A., 116, (1950): 117-119.

⁹Editorial: Latest on "M" Vaccine. Hoard's Dairyman, (April 25, 1951): 352.

Encephalitic Toxoplasmosis in a Cat

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Naturally occurring Toxoplasma infection is rarely recognized in cats and appears never to have been diagnosed clinically. Olafson and Monlux² identified the organism in the lungs and mesenteric nodes of a 1-year-old cat acutely ill with symptoms of anorexia, fever, cough, and mesenteric node enlargement. Terminal colonies unaccompanied by inflammatory reaction were found by Wickham and Carne⁴ in the brain and spinal cord of a paralyzed cat. In the case of a 12-year-old cat affected for several weeks with symptoms of drowsiness, ataxia, spastic paresis of the legs, and exaggerated placing reflexes, Verlinde and Makstenieks³ reported observing pseudocysts in the cerebrum and suggestive sickle-shaped bodies

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in areas of subacute inflammation of the cervical spinal cord. Pseudocysts were recognized by Bolle¹ in the cerebrum, spinal cord, optic nerve, and an esophageal nerve plexus of a 3-year-old house cat whose symptoms included epileptiform seizures, difficulty in chewing, optic nerve damage, bladder and bowel paralysis, circling, and paresis of the hind parts.

Acute systemic toxoplasmosis was suspected by Dr. Robert Griffiths at Angell Memorial Hospital in a 1½-year-old female cat ill for ten days with symptoms including fever, anorexia, polydipsia, marked enlargement of the abdominal lymph nodes, and a moderately elevated leukocyte count in which immature neutrophils were numerous. Although lymph nodes removed at exploratory laparotomy showed only inflammatory changes, Toxoplasma bodies were recognized by Dr. D. L. Coffin in liver tissue taken at autopsy.

Since puzzling disturbances of locomotion and equilibrium are encountered not infrequently in cats and are usually unassociated with gross lesions, it seems worth while to report such a case recently observed at Angell Memorial Hospital, and to suggest that thorough histological examination in similar instances might perhaps disclose that toxoplasmosis of the central nervous system should be considered as one possible cause of a type of disorder in cats which small animal practitioners frequently find difficult to explain and which is resistant to treatment.

CASE REPORT

On May 5, 1952, a 7-year-old black, long-haired female cat was admitted to Angell Memorial Animal Hospital. She had lived entirely indoors and received a varied diet. Always a "poor mother," the cat had had her last litter four years before and none of her offspring survived. Nine months before admission, she had begun to seem ill and to lose weight. The owner treated her for tapeworm, but the weight loss continued, although she ate as much as a large cat till two days before admission, when her appetite failed and a marked thirst developed. At the same time she started to twist to the right and fall forward.

On examination, the cat was found to be emaciated, weighing only 5 lb., but not dehydrated. Her head was tilted down on the right side and turned to the right. The

pupillary reflexes seemed normal but nystagmus was marked. No parasites, foreign material, or other abnormalities were observed in the ear canals. There was an abdominal mass related to the posterior surface of the liver. The cat's gait was weak and incoördinated. Her temperature was 101 F.

A lateral radiograph confirmed the impression of a mass posterior to the liver and revealed another shadow in the renal region.

Laboratory findings were: total leukocyte count, 20,000 per cmm.; hemoglobin, <5 Gm./100 ml.; blood urea nitrogen, >231 mg./100 ml.; creatinine, 6 mg./100 ml.; urinalysis—color, clear light yellow; specific gravity, 1.011; pH 6.0; albumin++;

sugar and indican, negative; sediment, abundant red cells and a few granular cast segments.

Treatment with chloramphenicol,* vitamin B complex, and subcutaneous administration of isotonic dextrose produced no favorable response. The cat did not eat or drink and the twist of the head remained. The nystagmus became somewhat less pronounced but the pupils were increasingly dilated and the pupillary reflexes became sluggish. Emaciation progressed and the marked polyuria brought on dehydration despite the generous administration of fluids. The cat, therefore, was destroyed by intracardial injection of sodium pentobarbital.

*Chloromycetin, Parke, Davis and Co., Detroit, Mich.

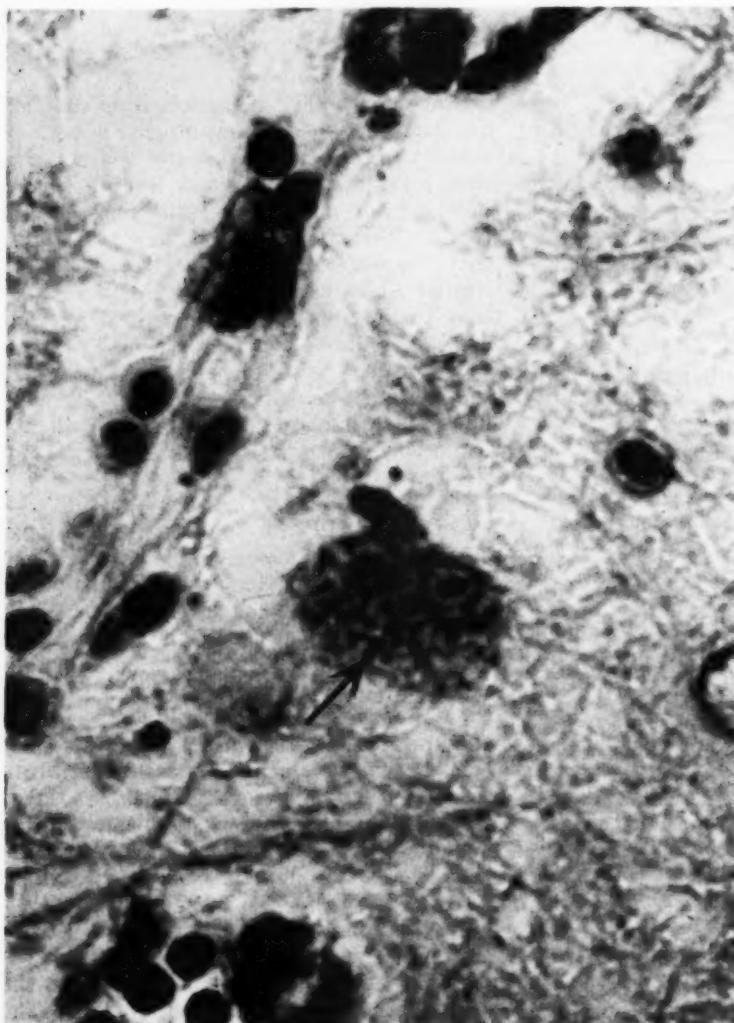


Fig. 1—Toxoplasma pseudocyst (center of field) in an area of rarefaction in the hippocampus. Moderate plasma cell infiltration is evident. x 1,750.

Autopsy Findings.—The body was markedly wasted, the fatty tissue and the skeletal muscle masses being much reduced. Lymph nodes throughout the body appeared atrophied. The lobes of the thyroid were deep reddish brown, small, desiccated, and friable. The thoracic organs presented no abnormalities.

The liver as a whole seemed normal in size and consistency but was a light yellowish red, with yellow mottlings and foci. The left medial lobe was largely replaced by a bulging, amber-colored, cystic mass which, when sectioned, appeared to be composed of small cysts of varying size from which oozed a clear fluid. The gall bladder was distended with bile and its duct was patent.

The spleen and adrenal glands presented no abnormalities. The left kidney was very small and its surface irregular. Its capsule stripped away easily. On sectioning, the cortex was seen to be irregularly reduced. The right kidney was somewhat smaller than normal and similar to the left in appearance. Sectioning revealed a round, soft, whitish area about 2 mm. in diameter in the parenchyma of the posterior pole. The capsule in this area was in extensive contact with a large retroperitoneal accumulation of pus, extending about 5 cm. posterior to the kidney. The ureters, bladder, urethra, and genital tract appeared normal.

The pancreas, pale, with occasional minute glassy areas, seemed on palpation to be thickened and somewhat tough. The digestive tract presented no noticeable changes.

Dissection of the ears revealed no abnormality except absence of the right tympanic membrane. No gross changes were noted in the superficial appearance of the brain.

Tissue specimens preserved in formalin and swabs and smears of pus from the retroperitoneal abscess were submitted for study to the Armed Forces Institute of Pathology, Washington, D. C. The significant findings were substantially as reported below.

Histology.—Central Nervous System.—Two significant lesions were observed. One, within the central portions of the hippocampus on one side, in the vicinity of vessels, consisted of an area of rarefaction of the brain substance and a slight, primarily perivascular infiltration of leukocytes, mainly of round cell type. In this same area, a dark brownish pigment was observed in macrophages. Within the margin of this zone of rare-

faction was a large cystic structure containing numerous small elongated bodies with an eosinophilic substance containing a basophilic central body. This was considered typical of a Toxoplasma pseudocyst (fig. 1). In another area of the cerebral cortex there was rather extensive perivascular cuffing of round cell type, about both the larger vessels and the capillaries. This was observed also in relation to the vessels of the adjacent meninges. A few structures suggestive of single Toxoplasma bodies were noted in the meninges.

Liver.—Some areas were of relatively normal architecture, while elsewhere varying degrees of change, sometimes quite extensive, were present. Throughout the organ there was increased cellularity about the portal triads, with numerous small round cells and masses of slightly larger cells with round or oval vesicular nuclei, suggestive of those of bile duct epithelium. In the vicinity of some of the central veins, there was dilatation of some of the sinusoids with some loss and dissociation of the hepatic cords. The extensive cystic areas were composed of spaces of varying size, lined with a single layer of epithelial cells varying from a cuboidal to a flattened squamous type. These cells had an eosinophilic cytoplasm and round to markedly oval nuclei that were slightly vesicular, with well-defined membranes. The cyst walls consisted of variable amounts of fibrous tissue within which were small ducts, suggestive of bile ducts and with an epithelium similar to that lining the larger cysts. Also within these trabeculae were variable-sized masses of hepatic cells. The cysts appeared to be of bile duct origin and the cystic areas blended with the surrounding hepatic tissue. The cystic lesion was considered the result of a congenital bile duct hamartoma.

Pancreas.—Scattered throughout were a considerable number of nodules of newly formed acinar tissue varying in diameter up to several millimeters. Usually well demarcated from the surrounding parenchyma, they consisted of a proliferation of epithelial cells recapitulating the normal acinar architecture to a considerable degree, but without islet formation. These adenomata were considered typical of those not uncommonly observed in old cats.

Spleen.—There was atrophy of both white and red pulp, the latter having undergone replacement to a variable degree by round cells of plasma cell type, a change interpreted as a stress phenomenon. Elements suggestive of Russell bodies were also noted.

Kidney.—Involvement was variable. Within the cortex were areas, usually linear in arrangement, of interstitial leukocytic infiltration, primarily of round cell type, with in some instances an associated increase in fibrous connective tissue. Sclerosis of an occasional glomerulus was observed, associated possibly with degenerative changes in the tubules. Some of these areas extended to the capsular surface of the cortex which was usually indented. They also extended variably into the medulla. The latter was extensively involved by an

acute necrotizing inflammatory process characterized by extensive infiltration of leukocytes and abscess formation. Within the tubules were observed massive colonies of bacteria. In some instances, this process extended into the deeper portions of the cortex. The kidney changes were considered suggestive of a relatively long-standing chronic interstitial nephritis upon which an acute ascending pyelonephritis had been superimposed.

Bacteriology.—The smears of pus from the retroperitoneal abscess, stained with Giemsa's stain, disclosed primarily neutrophils and numerous bacteria, mainly chains of streptococci but rod-shaped forms as well. Cultures were reported as negative.

SUMMARY

A case of encephalitic toxoplasmosis in a cat has been described. Although hospitalized for observation of central nervous symptoms, the cat died as a result of chronic interstitial nephritis, complicated by an acute ascending pyelonephritis and associated retroperitoneal abscess apparently in no way related to the brain lesions. Benign adenomas of the pancreas and extensive bile duct cysts were also present.

It is suggested that toxoplasmosis should more often be considered as a possible cause for the puzzling disturbances of equilibrium and locomotion encountered in cats.

References

- ¹Bolle, W.: Zur vergleichenden Pathologie der Toxoplasmenenzephalitis. *Zentralbl. f. allg. Path.*, 89, (1952): 313-318.
- ²Olafson, P., and Monlux, W. S.: Toxoplasma Infection in Animals. *Cornell Vet.*, 32, (1942): 176-190.
- ³Verlinde, J. D., and Makstenicks, O.: Een geval van hydrocephalie in verband met toxoplasmose bij een kat? *Maandschr. voor Kindergeneesk.*, 17, (1950): 360-365.
- ⁴Wickham, N., and Carne, H. R.: Toxoplasmosis in Domestic Animals in Australia. *Austral. Vet. J.*, 26, (1950): 1-3.

Hormone Therapy for Eczema in the Cat

Miliary eczema of the cat, for years a troublesome condition, seems to respond to endocrine therapy. While this condition occurs rarely in other cats, it is most common in castrated males of any age. The alopecia and eczema, which usually starts at the base of the spine and may spread to most parts of the body, causes a severe itching, and the continual licking may result in hairballs and indigestion.

Forty-two cases presented to the author

were given subcutaneous implants of testosterone to provide possible hormonal stimulation to replace that denied by castration. The cats were anesthetized, the skin prepared, a small incision made on the medial side of the lower thigh, and the testosterone pellets carried downward, with forceps, subcutaneously to the region of the hock. The pellet was thus placed so it could not work back to, and be licked from, the incision which was then sutured.

The following effects may be expected from testosterone implants: After two weeks, improvement may not be evident but the skin condition should be arrested, and the appetite should be improved; the patient may have a temporary, objectionable sex stimulation. In five weeks the temperament should be nearly normal and new hair appearing. The cat should be normal and healthy by the eighth or ninth week.

Methyltestosterone, simple testosterone, and testosterone propionate in implants of 25 to 50 mg. have been used. Simple testosterone is the most easily obtained and seems to be the best tolerated. The 25-mg. implants are totally absorbed in four months, with a 50-mg. implant lasting only a month longer. This treatment occasionally must be repeated.—*Vet. Rec.*, Dec. 5, 1953.

Comments on Above by Readers of Veterinary Record—(a) Some clients object to the above operation. Tablets of orchitic extract in the cat's food are effective and do not produce the temporary objectionable sex behavior. Ovarian extract in the food is preferable to stilbestrol in sterilized females. In 2 cases of hopeless eczema, an injection of cortisone brought dramatic, but temporary, improvement; if a cortisone implant were available, it might be the preferred treatment.

(b) Implants of 25 mg. of testosterone were used in 30 neutered male cats with only 2 requiring repeated implants. The cat was held in a comfortable position and, under local anesthesia, an incision was made above the shoulders. Then, using a cannula, the pellet was carried about 2 inches toward the head and deposited subcutaneously. The incision was sutured and a bandage applied.—*Vet. Rec.*, Dec. 26, 1953.

NUTRITION

Notes from the Cornell Nutrition Conference Nov. 5-6, 1953

Use and Abuse of Medicaments in Feed.—Medication is effective only when the diagnosis is accurate. As practiced at present, subacute intoxications occur more commonly than is recognized. Agents which are incompatible, such as para-aminobenzoic acid for chronic respiratory disease and sulfonamides for coccidiosis control, are sometimes fed simultaneously. Flowers of sulfur, sometimes used as a coccidiostatic agent, may interfere with normal bone formation in chickens and some sulfonamides may affect the calcium deposit in eggshell formation. Furthermore, such drugs may be objectionably found in poultry meats and eggs, just as antibiotic drugs, when promiscuously fed to cows, may be found in their milk.

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Factors Affecting Turkey Growth and Egg Hatchability.—Since niacin, vitamin E, and grass juice seem important in the nutrition of pouls, their effect on egg hatchability was tested. When added to a satisfactory basal ration, niacin affected neither growth, feed consumption, egg production, nor hatchability; *alpha*-tocopherol acetate (vitamin E) did not affect growth, feed consumption, or egg production but did increase hatchability. The addition of 5 per cent grass juice concentrate, while not affecting feed consumption, egg production, or hatchability, accelerated growth and reduced mortality.

• • •

Protein Requirements for Swine.—Recent research has established that rations, 10 to 14 per cent protein, when balanced with vitamins, minerals, and antibiotics, result in satisfactory growth of pigs. However, the feeder should be warned against rations too low in protein since many have never fed enough protein. Low protein rations reduce disease resistance and may cause pigs to be poor vaccination risks.

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Effect of Calcium on Other Nutrients.—Much emphasis has been placed on the advantages of feeding sufficient calcium but little consideration has been given to the disadvantages of feeding too much. Calcium can interfere with the assimilation of other minerals, especially phosphorus. When pulverized limestone is fed to dairy heifers as a supplement to grass silage, in the amounts sometimes used, it may have a depressing effect on the digestibility of protein and of energy production. The excessive calcium supplementation of dairy rations should be avoided.

• • •

Effects of Nutrition on Bovine Growth, Repro-

duction, and Lactation.—Heifers raised on low nutrient rations prior to their parturition may recover normal size by the time of their second parturition, if liberal quantities of feed are provided. They produce about the same amount of milk during their first lactation and seem to conceive more readily than do heifers given greater quantities of feed during early life. However, information is not yet available on the effect these poor rations in early life may have on lifetime production.

Zero Pastures for Dairy Cows

To save the 25 per cent of available feed which may be wasted by cows when grazing on pasture, the suggestion is made that instead of sending the cows to pasture the pasture should be brought to the cows. The advantages include: harvesting the green crop at its proper stage of maturity; eliminating fencing and providing water at pasture; and avoiding the drop in milk production which occurs when the pasture gets short, as during a dry spell. The disadvantages are the labor required in cutting, hauling, and feeding the grass and the cost of maintaining and servicing the harvesting equipment. In this experiment, the harvesting was done twice daily at 7 a.m. and 2 p.m. The saving, on a green basis, was estimated at 920 lb. of feed for 50 cows daily.—*New Jersey Agric.*, Dec., 1953.

Degossypolized Cottonseed Meal

Modern methods of processing cottonseed now remove most of the gossypol, an agent toxic to animals with a simple stomach, thus greatly improving the meal as an animal feed (*Eastern Food Merchant*, Nov., 1953). Processed by the old methods, cottonseed meal sometimes contained as much as 1 or 2 per cent of gossypol; with modern methods, it contains 0.02 to 0.04 per cent. This can be accomplished either by using certain reagents or by a method which includes considerable cooking. However, heating above 200 F. may reduce the lysine and the methionine content by about one-fourth. As a protein supplement for feeding hogs and chickens, a mixture of equal parts of degossypolized cottonseed meal and soybean meal is superior to either alone, since the

cottonseed meal is relatively low in lysine but high in methionine and cystine, while soybean meal is low in methionine and cystine but high in lysine.

Nutritional Deficiencies in Sheep

The loss of 3 million sheep and lambs from malnutrition in the hill regions of Scotland in 1947 stimulated deficiency studies. Since the growth of herbage is limited to the five warm months, the ewes, lacking energy and protein food, often lose 25 to 50 per cent of their weight during the gestation period. Adding energy-rich foods to the ration produced marked improvement in lambing percentage and weight gains, whereas mineral supplements alone did not.

Tissue analysis revealed that certain bones, such as the thoracic vertebrae, showed a greater depletion than did others. The trace minerals, copper and cobalt, were most commonly deficient. Even with sufficient copper in the feed, it apparently was rendered nonavailable by some factor. Cobalt deficiency which causes a wasting condition, with severe anemia and failing appetite, was neither prevented nor cured by the intravenous injection of cobalt salts, but small quantities of cobalt sulfate added to the diet was beneficial. This supports the hypothesis that cobalt is utilized in the rumen, reticulum, or omasum. Doubtless, other grazing areas are similarly affected.

—*Nutr. Rev., Jan., 1954.*

Milk Fever Prevented by a Low Calcium Diet

An experiment in California, on a Jersey herd with a high incidence of parturient paresis, indicates that a low calcium diet during the dry period may prevent the disease. On the theory that the parathyroid gland increases the calcium content of the blood, either by preventing its elimination or by securing more from the bones, and that during the dry period when less calcium is needed the parathyroids become relatively inactive and sluggish, a low calcium diet during the dry period, to keep the parathyroids active, was tried.

As a result, 10 of the 33 control cows given a high calcium diet while dry, developed the disease at calving time; of 20 cows on a balanced phosphorous-calcium diet, only 3 developed the disease; and of

the 16 on the low calcium diet, none developed parturient paresis. Eight of the latter group were placed on a high calcium diet during their next dry period and 4 developed parturient paresis. The low calcium diet, consisting of oats, hay, barley, and monosodium phosphate, contained 1.0 part of calcium to 3.3 parts of phosphorous. Monosodium phosphate (40 lb. to 1 ton of grain feed is effective) is relatively cheap and does not seem to affect the cow's later production. It also is recommended that no legume hay be fed to cows while they are dry.—*Hoard's Dairyman, Jan. 10, 1954.*

Problems in Algae Culture

Production of the unicellular green algae, Chlorella, a prolific potential source of food, feed, fertilizer, or fuel, is yet impractical. The green algae can convert into chemical energy a great deal more of the radiant energy which strikes a unit area than can higher plants. It is a highly efficient photosynthesizer and its rate of growth is the most rapid known.

The production of 35 tons (dry basis) per year per acre of culture medium is a possibility compared to 0.75 tons per acre for soybeans. However, production in open ponds faces the hazards of contamination with protozoa and bacteria, costly harvesting, and spoilage unless quickly frozen or dried, both of which are expensive. It is also difficult to maintain the desired carbon dioxide concentration. These hazards can be avoided by production in a closed system, a process which is not yet economical.

—*Agric. and Food Chem., Dec. 23, 1953.*

Pyridoxine deficiency caused convulsions in infants fed a milk substitute consisting of de-fatted cow's milk, vegetable and animal fats, vitamins, and iron. When pyridoxine (vitamin B₆) was added to the food, there were no further difficulties.—*J. Am. M. A., Jan., 1954.*

Cattle suffering from copper deficiency eat more salt, chew paper or other foreign material, scour, and become emaciated. Copper sulfate, 5 Gm. *per os* twice a week, or 2 Gm. *per ounce* of bone meal, fed free choice, is beneficial. It may also be given intravenously as a weak solution but not so safely.—*J. A. Henderson, D.V.M., Ontario Veterinary College, Guelph.*

EDITORIAL

That Long Last Mile in Bovine Tuberculosis Eradication

The Bovine Tuberculosis Eradication Program, once a robust and popular campaign against the insidious equivalent of man's "great white plague," now shows signs of suffering from senility and anemia. Meanwhile, its quarry, like a vicious beast, battered and driven to its lair by a once concerned and resentful public is, instead of being destroyed while cornered, apt to become the benefactor of the complacent "let George do it" attitude of that same, but now less concerned, public.

It is disturbing to learn that in spite of its existing anemia the program is due for some additional blood-letting. In the name of a worthy cause, national economy, the federal indemnity for tuberculosis reactors has been eliminated from the budget of the Department of Agriculture on which hearings were being held at the time this was written.

Also of concern is an overconfidence and indifference in many who seem to consider bovine tuberculosis as an already eradicated disease. Significantly, the report of the chief of the Bureau of Animal Industry, 1953, states that "Although the overall rate of tuberculosis in cattle is very low, in some states the incidence of infection is increasing."

Examples of the resurgence of bovine tuberculosis are numerous but may we briefly cite one which was found in a small, beef-type herd in March, 1938. From the inception of the voluntary program this "closed" herd had been tested regularly with never a sign of a reaction, nor had reactors been found in neighboring herds. Yet, when the intradermal test was applied to the 7 older cattle and 3 calves, 8 of the 10 (all but a recently purchased milk cow and a young calf) reacted, some with swellings larger than hen eggs; the reactors subsequently showing lesions. On the second re-test, the cow and calf also reacted.

The spreader must have been an aged cow, negative on two previous tests, which had recently been sent to market because of progressive emaciation. Had this infection

occurred after the area re-test interval was lengthened, had it been in a large herd, and had the herd been dispersed without test, as is legal and usual at farm sales in many states, how far might the disease have travelled and what might have been the cost of subduing it?

The bovine tuberculin test was originally introduced into the United States from Koch's laboratory in Germany, by Dr. Leonard Pearson, in 1891. After extensive, successful field trials, the Tuberculosis Eradication Division was established in the Bureau of Animal Industry on May 1, 1917. Then on Dec. 23, 1917, the Accredited Herd Plan was launched, soon to be supplemented with the Accredited Area Plan. In the words of the late Dr. J. A. Kiernan, first administrator, it was "the most gigantic work ever assumed by the veterinary profession." With tuberculosis rare, except locally in cattle of the southern and western states, Dr. Kiernan predicted that, by 1930, two thirds of the area of the United States would be free of the disease. However, he cautioned that success would depend not only on the veterinarians, the legislators, and the sanitary officials, but largely on the attitude of the livestock owners.

Economic factors were favorable for the launching of such a program. The sharp drop from war-inflated levels, in the price of cattle and other farm produce, about 1920, facilitated the selling to the owners, of a plan which paid an indemnity for a damaged, surplus product. Furthermore, this economic trend made it both possible and desirable for the veterinary practitioners to coöperate. Testing reached its peak, with 25 million cattle tested, in 1935, and then fell rapidly to 11 million in 1939. It has remained near that level since, with 9,675,245 tested in 1953.

Meanwhile, the national incidence of bovine tuberculosis had dropped gradually from 4.9 per cent in 1918 to 1.5 per cent in 1935 and 0.11 per cent in 1953. However, the records of many isolated, heavily

infected areas is more dramatic. In the District of Columbia, used as a trial test area, tuberculin reactors were reduced from 18.87 per cent in 1910 to 0.84 per cent in 1917; and Virginia, with 18.27 per cent reactors in 1910 and 6.39 per cent in 1917, was down to 0.3 per cent in 1953.

The prediction of great areas soon being free of the disease has, for some reason, not yet been realized. Instead, in 1953, the reactors were surprisingly uniformly distributed. In only one state, Nevada, were no reactors found, yet only five states had more than 0.2 per cent reactors, with Louisiana's 0.49 per cent being high. This uniformly low incidence raises a question about the irreducible minimum. Could it be that the slower, more patchwork type of testing is less thorough than when larger areas are more simultaneously tested? Or is it because cattle are being reinfected by man or other animals? Or is it possible that many of these reactions are of the nonspecific type and that bovine tuberculosis actually is more nearly eliminated than indicated?

The human species also has profited much from the reduction of tuberculosis in cattle. The death rate in man from the bovine type of infection which, in 1900, was 19.9 per 100,000 population dropped to 1.7 in 1950, a 91.5 per cent reduction. During the same period, deaths from the human type of tuberculosis dropped 86 per cent.

Truly, the reduction both in the bovine type of human infection and in bovine tuberculosis is a remarkable achievement but apparently, as in climbing a mountain peak, the nearer the goal the harder the going. No one doubts that the job ultimately will be done but complacency and apathy will increase the difficulty and may indefinitely postpone total eradication.

We urge the House Agricultural Appropriations Committee and every congressman to take a second look at the score sheet on bovine tuberculosis eradication before eliminating federal indemnities for reactors for "economy" reasons. To withdraw support now is, in our judgment, a shortsighted and dangerous move. The record does not justify such action.

Two of the most puzzling swine diseases have opposite peculiarities. Erysipelas, caused by a known organism, can not be

Veterinarians Fighting Livestock Diseases Around the World

In an article dealing with food supply needs for an ever-growing world population, the *Chicago Daily News* recently paid tribute to the veterinary profession. Veterinary teams organized by the United Nation's Food and Agricultural Organization (F. A. O.) are credited with making "inroads against cattle diseases in such far-flung places as Thailand, Ethiopia, Burma, Afghanistan, Indonesia, India, Pakistan, Greece, Yugoslavia, Austria, and Colombia."

Referring to the veterinarians working in these countries as "modern medical missionaries" who often have to work under primitive conditions, the writer of the article states that before the F. A. O. campaign, rinderpest killed millions of cattle annually in Ethiopia. Now they believe the disease can be eliminated in five years, as it has been in Thailand.

Also mentioned is the campaign against paralytic rabies in Mexican cattle, caused by the bite of Vampire bats. Vaccinating the cattle and exterminating the blood-sucking bats is the program being carried out. Mention is also made of the foot-and-mouth disease research being done at the research laboratory in Colombia. In conclusion, the article says that although "these programs for the most part are carried out on a modest scale, due to budget limitation, their cumulative effect over the years should mean the filling of a lot of stomachs around the world."

reproduced readily, while atrophic rhinitis with its cause unknown can be reproduced readily.—T. L. Jones, D.V.M., Ontario Veterinary College, Guelph.

More laws affecting veterinary medicine were passed by the last Iowa legislature than were passed in the previous twenty-five years. They include a liberalized indemnity law; the legalizing of modified live virus vaccines; legalizing lay vaccination with modified live vaccines without a permit; a law requiring the cooking of garbage; and modification of the bovine brucellosis control law.—H. U. Garrett, State Veterinarian, Iowa.

CURRENT LITERATURE

ABSTRACTS

Experimental Vibrio Fetus Infection in Guinea Pigs

Characteristic pathological alterations were observed in the uteri of guinea pigs infected experimentally with *Vibrio fetus*. These consisted of epithelial sloughing, inflammatory cell reaction, hemorrhages, enlarged blood vessels, extensive myometrial and subendometrial edema, and cystic uterine glands. The most noteworthy histological changes of the fetal tissues were hemorrhages of the myocardium and liver.—[M. Ristic, L. Wipf, E. V. Morse, and S. H. McNutt: *Experimental Vibrio Fetus Infection in Guinea Pigs. II. Pathological Aspects*. *Am. J. Vet. Res.*, 15, (Jan., 1954): 137-139.]

Immune Response with the B1 Strain of Newcastle Disease Virus

A study was undertaken to determine how early immunity against two routes of challenge exposure develops in chicks following vaccination with the B₁ strain of Newcastle disease virus (NDV) at 1 day of age. Immunity against respiratory exposure with a virulent strain of NDV was demonstrable within forty-eight hours following ocular vaccination of day-old chicks with the B₁ strain of NDV. Resistance to intramuscular challenge was not apparent until approximately the eighth day postvaccination. These findings suggest that a cell block phenomenon results from the vaccination, followed by the formation of specific neutralizing antibodies in the circulatory system.—[Philip G. White and George S. Appleton: *The Speed of Immune Response Following Vaccination with the B1 Strain of Newcastle Disease Virus*. *Am. J. Vet. Res.*, 14, (Oct., 1953): 609-611.]

Experimental Vesicular Stomatitis in Dogs, Ferrets, Chinchillas, and Hamsters

The susceptibility to infection with the 1949 Wisconsin strain, New Jersey type of vesicular stomatitis virus by different routes of exposure was determined. The hamster (*Cricetus auratus*), chinchilla, (*Chinchilla lanigera*), and ferret (*Putorius furo*, Linn) were tested for the first time and found readily susceptible. The dog (*Canis familiaris*), previously tested, was highly resistant.

Ferrets were susceptible to infection introduced intradermally, intramucosally, intracerebrally, intracardially, by corneal scarification, and by intranasal instillation. The intracerebral and intranasal route of exposure proved to be the most effective in inducing infection in the hamsters and chinchillas.

The results of prior studies conducted in this laboratory indicate that the horse, cow, pig, and guinea pig are highly susceptible to intradermal infection, to a limited extent according to species, by other routes.—[T. Kowalczyk and C. A. Brandly: *Experimental Infection of Dogs, Ferrets, Chinchillas, and Hamsters with Vesicular Stomatitis Virus*. *Am. J. Vet. Res.*, 15, (Jan., 1954): 98-101.]

Macroscopic Brain Dissection

A historical review of macroscopic brain dissection, with a short description of the method used at Basel, Switzerland, is given. The brain is fixed by immersion in 5 per cent formalin, washed in tap water for four to six hours, frozen for at least five days, then thawed and dissected. This report on the author's experience with this method attempts to acquaint veterinary anatomists with a simple technique for preparing macroscopic brain specimens.—[Hermann Meyer: *Macroscopic Brain Dissection in Veterinary Anatomy*. *Am. J. Vet. Res.*, 15, (Jan., 1954): 143-146.]

Retained Placenta

Removal of the corpus luteum of pregnancy in the cow and early discontinuance of progesterone replacement therapy was followed by a high incidence of placenta retentions following abnormally long gestation periods. Progesterone injections prior to the expected calving date in 5 cows which had previously been subjected to corpus luteum removal was followed by placenta expulsion and normal gestation periods.—[Leslie E. McDonald, S. H. McNutt, and R. E. Nichols: *Retained Placenta—Experimental Production and Prevention*. *Am. J. Vet. Res.*, 15, (Jan., 1954): 22-24.]

Evaluation of Teat Erosion

Reproductions of the bovine teat have been produced before and after it has been subjected to a stimulus suspected of causing teat erosion. The first step is the preparation of an impression. A mixture of three parts of Kerr's snow white impression plaster No. 2 and one part of water has yielded satisfactory results. The plaster must be thin enough to pour. Failure to pour at the proper consistency will result in the formation of air pockets and difficulty in forcing the teat into the plaster. The second step is the reproduction of the teat structure, which is prepared by using 100 parts of Kerr's rapid stone (a synthetic stone) and 31 parts water. The stone is added in small amounts, allowing each portion to be vibrated down into the impression by the use of a dental

vibrator. The stone mixture must not be too thin or air pockets and uneven texture will result. Best results are obtained when just enough stone is mixed for the pouring of a single reproduction.—[R. P. Pirozok, R. D. Macbrie, and C. F. Helmboldt: *A Method of Reproducing Teat Topography (Structure) for Evaluation of Teat Erosion*. *Am. J. Vet. Res.*, 15, (Jan., 1954): 140-142.]

FOREIGN ABSTRACTS

Body Temperature and Abomasal Function

Two buffalo with duodenal fistulas were used in the experiments. When the body temperature was raised to 41 C. by exposure to the sun, the volume of ingesta delivered through the fistula in a five-hour period was reduced from the normal 23.5 liters to 11 liters. The number of gushes was also cut in half.—[N. G. Boychenkova and N. S. Filkov, *Daghestan Agriculture Institute: On the Influence of Short Time Elevation of Temperature on the Evacuation of the Abomasum*. *Veterinariya*, (Moscow), 30, (July, 1953): 40-41.]—R.E.H.

Toxicity of Phenothiazine for Horses

Experience with mass treatment of horses in the U.S.S.R. indicates that phenothiazine is harmless when administered in doses no greater than 0.1 Gm. per kilogram of body weight, or 40 Gm. for an adult horse, and provided that the horses are well nourished. It is recommended that horses be treated when on pasture. Toxic reactions occurred only in stabled horses in the winter and were attributed to nutritional deficiency.—[P. A. Velichkin and S. A. Yakovlev: *On the Question of the Toxicity of Phenothiazine for Horses*. *Veterinariya* (Moscow), 30, (Aug. 1953): 46-48.]—R.E.H.

Myxomatosis in Hares and Rabbits

The spread of myxomatosis can be either by direct contact or by means of contaminated fodder and bedding. Indirect transmission by human beings has been established. Insect transmission appears to be of minor consideration.

Immunization of domestic rabbits, using Shope fibroma virus has been tried. In some cases, 60 to 70 per cent of vaccinated rabbits have been resistant. In other cases, few or none of the injected rabbits showed resistance.—[G. Ramon: *Considerations on Myxomatosis in Hares and Rabbits*. *Bull. Off. internat. des Epizoot.*, 39, (1953): 785-792.]—J.P.S.

Giant Cells in Milk Sediment

The finding of giant cells in milk sediment makes the diagnosis of tuberculosis of the udder easier, since they are present in the milk almost regularly in such cases and can be easily recognized in the smears.

Giant cells are also found in the sediment of milk of cows with *Brucella abortus* and are also

a reliable help for the diagnosis of brucellosis of the udder. Brucellosis of the mammary gland is indicated if giant cells are traceable in the milk sediment, together with a distinctly positive agglutination test of the milk, provided tuberculosis of the udder is excluded at the same time by guinea pig test or by repeated microscopic examinations.—[H. Baumgartner: *The Importance of the Giant Cells in the Milk Sediment*. *Schweiz. Arch. f. Tierheilk.*, 6, (1953): 327.]—F.K.

Immunization for Leptospirosis in Dogs

A vaccination of dogs by a double subcutaneous injection of 1 cc. of *canicola*-adsorptive vaccine at intervals of fourteen days protected dogs against an infection of *Leptospira canicola*.

The protective effect was controlled by regular cultivative and serological tests of blood and microscopic examination of the urine.—[A. Kruger: *Experiments of Immunization Against the Canicola Leptospirosis of Dogs*. *Berl. und Munch. tierarztl. Wochenschr.*, 22, (1953): 373.]—F.K.

Infectious Anemia of Horses

Difficulties in the control of infectious anemia of horses are in part due to the following: (1) the epidemiology is obscure in many particulars; (2) the virus is relatively less known than other animal viruses; (3) the descriptions of this disease are variable and not precise; (4) diagnosis is difficult.

Insect transmission of this disease can be assumed to be proved. Contact infection is not incriminated. Great concentrations of horses, as in war, have not been followed by an increased incidence of the disease.

The virus of infectious anemia almost always produces a chronic disease, often of a latent character.

No specific diagnostic methods have as yet been developed. The presence of sublingual petechial hemorrhages appears to be one of the best diagnostic lesions.—[G. Shoop: *Diagnostic de l'anémie infectieuse des Equides*. *Bull. Off. internat. des Epizoot.*, 39, (1953): 703-707.]—J.P.S.

BOOKS AND REPORTS

Avian Physiology

This is the first book devoted specifically and comprehensively to the subject of avian physiology. It includes information about numerous avian species, but the chicken, duck, and pigeon, which have been frequently used in establishing our present knowledge of avian physiology, are predominantly considered. In several portions, appropriate comparisons of avian and mammalian physiology are made, adding to the significance of the subject for the veterinarian. It is indeed fortunate that such a long-needed work has become available and that its subject matter is directly applicable

to an industry (poultry) that has assumed vast proportions in recent years and which is still undergoing marked expansion.

The first 16 chapters engagingly and concisely deal with the blood and circulation, respiration, metabolism and heat regulation, the alimentary canal, the kidneys and urine, the special senses, and reproduction. One of these, a chapter on electrocardiography, merits special mention. It stimulates attention to recent and interesting developments toward a broader knowledge of heart irregularities in birds and circumstances under which they have been observed to occur. The remaining five chapters are outstanding and deal commendably with a modern interpretation of endocrine physiology.

An extensive bibliography of pertinent references, complete with titles, is presented at the end of each chapter. This feature will be of marked interest and extremely useful to the more enthusiastic student, the teacher, the research worker, and others wishing to examine more complete works. A total of 45 coördinately informative tables and 77 excellent figures are included, adding much to the completeness and thorough understanding of the subject. The book is published in an appealing format, is worded clearly, concisely, and with pleasing thought expression.

In the preface the author states that, "this book should be of especial interest to teachers, students, and research workers in poultry science and husbandry and in veterinary medicine." Through such a commendable contribution, it is obvious that he has admirably attained that goal. It can be stated, in addition, that it will also prove to be of especial interest to practicing veterinarians in many localities through providing a broader rational basis on which our profession may better serve the poultry industry.—[*Avian Physiology*, By Paul D. Sturkie, Professor of Poultry Physiology, Rutgers University, New Jersey. Cloth. 443 pages. Comstock Publishing Associates, a division of Cornell University Press, Ithaca, N. Y. 1954. Price \$6.00.] —PAUL L. PIERCY.

Handbook of Meat By-Products

The first section of the fourth edition of this practical handbook discusses the husbandry, with regard to meat production, of cattle, swine, sheep, and horses, including the German breeds. The world meat economy is given by statistical data about the meat and fat production, its import and export, price, and consumption. A portion is also devoted to the slaughterhouses, different slaughter processes, the handling of intact carcasses, and the utilization of by-products including the blood, hair and bristles, intestines, bones, endocrine glands, and hides. A special chapter describes the role of slaughtering in the eradication of infectious and parasitic diseases. The meat hygiene practiced in different foreign countries is also considered.

The second section deals with handling and

utilization of the meat after the carcass has been cleaned and eviscerated. The technique of cooling and freezing meat and meat by-products, salting, pickling, smoking, the manufacture of canned meat, and canned sausages are also discussed.

The manufacture of ham and various kinds of sausages includes many formulas used in Germany. Price calculations of the meat and meat by-products, technical description of the machines used in the meat industry, and some legal labor questions are also described.

The last section of this handbook is devoted to the state laws, regulations and orders with regard to the transportation and marketing of meat animals. It also discusses the slaughtering of various species of animals, meat hygiene, and meat inspection. The final chapter discusses the German organizations of farmers, livestock dealers, butchers, and meat industrials.

The book presents a good deal of practical and professional information for anybody dealing with meat animals and meat by-products. It has been written, of course, for German interests; however, it may serve the interests of other countries.—[*Handbook of Meat By-Products (Taschenbuch der Fleischwarenherstellung)*. By F. Gruttmann and H. Schwerdt. 4th ed. 948 pages. Serger-Hempel, Braunschweig, 1953.]—F.K.

REVIEWS OF VETERINARY MEDICAL FILMS

Epidemic Foot-and-Mouth Disease—Saskatchewan, 1952.—Sound, 16 mm., color or black and white, running time about sixteen minutes. This film can be secured from the National Film Board of Canada, 1270 Ave. of the Americas, New York City 20, N. Y.

This film reports on how the 1952 outbreak of foot-and-mouth disease in Saskatchewan was brought under control. It describes how the disease affects cloven-hoofed animals, then shows the destruction and burial of all infected or exposed animals and the imposition of strict quarantine measures to prevent any escape of the highly contagious virus beyond the buffer zone. The meticulous disinfection of farms, vehicles, and all potential carriers is described. Finally, before the quarantine was lifted, it shows how test animals were employed to indicate the absence of the contagion.

This film serves as an excellent medium in describing and illustrating how a recent foot-and-mouth disease outbreak was quickly and successfully eradicated. It is an excellent review of this subject. The film does not, however, include the early history of this outbreak, showing the delay in establishing the diagnosis and reminding us of the problems that we must continually keep in mind relative to the possibility of our own native vesicular diseases masking a sudden or unexpected appearance of foot-and-mouth disease.

THE NEWS

Ninety-First Annual AVMA Convention

The Place—Seattle, Washington

The Dates—Aug. 23-26, 1954

The Headquarters—Olympic Hotel

Hotel reservations are to be made through the Housing Bureau. See reservation form and location map on advertising pages 50-51 in this issue.

A special AVMA tour leaflet describing the tours to be offered will be mailed to members soon.

Note.—Those who may be taking the train tour to Seattle can plan their hotel reservations for arrival on Sunday morning, August 22.

The May JOURNAL will contain general information about the scientific program and Section meetings and the July issue will be the Convention Number. For previous stories about the 1954 convention and Seattle, see the JOURNAL for January, pages 72-73; February, pages 161-162; and March, pages 238-239.



Trout fishing below Snoqualmie Falls near Seattle.



Portage Bay and the campus of the University of Washington in Seattle. The 1954 annual meeting of the AVMA will be held on August 23-26 in Seattle.



News From Washington



In a recent letter to the deans of veterinary schools in the United States, the Army announced a special program for appointment of certain senior students in the Army Veterinary Corps Reserve.

During March, senior students in veterinary schools may apply for appointment as second lieutenants, with concurrent active duty to commence in July or August. The tour of active duty is two years, although the applicant may volunteer for three years. The purpose of the program is to obviate the administrative delay which occurred last year in processing applicants for appointment and active duty after graduation.

Seventy-five veterinarians (1954 graduates) have been authorized under this program. Quotas have been allocated each Army Area Command. In filling quotas, preference will be given to those qualified applicants most vulnerable for induction under the regular draft and to those applicants who volunteer for three years of service. **Those not selected because of quota restrictions will be so notified on or about May 14, 1954.**

This program does not apply to senior students who will be appointed officers in the Veterinary Corps Reserve as a result of successfully completing ROTC training. Separate instructions regarding this group will be published by the Department of the Army.

* * *

New House Bills of Special Interest to Veterinarians.—H. R. 7817 (Martin (R), Iowa) would amend the Internal Revenue Code to **permit the sale of certain narcotic drugs that possess little or no addiction**, in comparison with morphine, codeine, or cocaine, on the oral prescription of a registered physician, dentist, veterinary surgeon, or other authorized practitioner.

The oral prescription must be put in writing promptly and filed with the druggist or dealer. The Secretary of the

Treasury would determine the narcotic drugs that could be prescribed orally. He is to consider the views of the Public Health Service, the Food and Drug Administration, and the secretaries of the national associations representing physicians, pharmacists, and narcotic drug manufacturers.

H. R. 8015 (Sheehan (R), Ill.) provides for investigations, experiments, and other activities leading to the **eradication of rabies** and related diseases in this country. The Surgeon General of the Public Health Service would be authorized to conduct research, demonstrations, etc., relating to the diagnosis, cure, prevention, and treatment of rabies and related diseases in animals and in man.

The bill also provides for the **Secretary of Agriculture and the Secretary of the Interior to take necessary measures** to control rabies and related diseases in animals in the U. S. The bill was referred to the Committee on Interstate and Foreign Commerce.

* * *

The Federal Communications Commission has announced that **rules regulating operation of medical diathermy equipment will be vigorously enforced**.

The Commission points out that diathermy machines not being operated in accordance with the Commission's rules may have harmful effects on (a) national defense as they affect radio-guided aircraft; (b) interference to safety radio service, including direct communication between planes and to airplane-landing systems, as well as police and fire radio service. Users of medical diathermy equipment are urged to check its operation with the Federal Communications Commission.

AVMA Office Address in Washington

Brig. General James A. McCallam (Ret.)
Room 109, 1507 M Street, N.W.
Washington 5, D. C.



—Trinidad and Tobago Tourist Board

Hindu temple at Reform village near San Fernando in Trinidad, B.W.I.

British Caribbean Veterinary Association to Hold Convention

As previously announced (March JOURNAL, p. 241), the British Caribbean Veterinary Association will hold its first convention on May 24-27, 1954, at Port-of-Spain, Trinidad. There will be four days of lectures and demonstrations

and two additional days have been planned for trips to points of interest on the island.

Trinidad, southern-most of the West Indian Islands, lies within sight of the South American mainland but is only twelve hours by air from New York or Miami and eighteen hours from Rio de Janeiro; by steamer, it is ten days

Grapefruit plantation in Santa Cruz Valley, Trinidad, B.W.I., taken from the Saddle Road.

—Trinidad and Tobago Tourist Board



from New York. The island is noted for its tropical, natural features, its asphalt lake, sugar cane plantations, rich soil in which cocoa, citrus, and other crops flourish, and for its cosmopolitan population and way of life.

Port-of-Spain, the capitol, has a population of about 100,000, with up-to-date hotel accommodations at reasonable rates. The climate makes the island a year-round playground for golf, tennis, swimming, and fishing.

The British Caribbean Veterinary Association cordially invites veterinarians from North America and other countries to attend the convention which will offer an educational program, an interesting vacation trip, and a friendly atmosphere. Further information, including hotel reservations, can be obtained by writing to Dr. Steve P. Bennett, chairman of the convention committee, 5 Cascade Rd., Port-of-Spain, Trinidad, B. W. I., or to Dr. Hohman Williams, Jr., c/o Department of Agriculture, Port-of-Spain.

Visual Aids in Parasitology

A compilation of titles and information pertaining to visual aids of value to instruction in general, medical, and veterinary parasitology

has recently been prepared by the Committee on Visual Instruction of the American Society of Parasitologists. Over 200 titles of motion pictures, film strips, and slide sets are listed.

Copies of "Visual Aids to Instruction in Parasitology" may be obtained from Dr. M. S. Ferguson, Communicable Disease Center, 50 Seventh Street, Atlanta, Ga.

Audio-Visual Conference for Medical and Allied Sciences

A new organization in the medical film field, the Audio-Visual Conference for Medical and Allied sciences, composed of audio-visual department heads of national organizations in the medical, dental, veterinary, and health fields, will meet during the convention of the National Audio-Visual Association in the Conrad Hilton Hotel, Chicago, Aug. 1-4, 1954. Dr. J. Edwin Foster, director of the Medical Audio-Visual Institute, is chairman of the conference; Helaine Levin, film librarian of the American Dental Association, is secretary-treasurer.

Livestock Conservation, Inc.

The annual meeting of Livestock Conservation, Inc., was held at the Union Stockyards in



One of the principal buildings of the School of Veterinary Medicine, University of Sao Paulo, Brazil. Sao Paulo is the site of the Second Pan American Congress of Veterinary Medicine, held April 3-10, 1954, as part of the Fourth Centennial celebration of the founding of Sao Paulo.

Many delegates from all the Americas are expected to attend the Congress.

The December JOURNAL (pp. 546-547) carried a feature story about the Sao Paulo meeting.

Chicago on Feb. 18, 1954. The following speakers participated in the program: **Drs. Fred O'Flaherty**, president, Livestock Conservation, Inc.; **J. R. Pickard**, general manager, Chicago; **Mike O'Connell**, assistant general manager; **R. L. Cuff**, Kansas City; **D. P. Mossberg**, St. Paul, Minn.; **J. C. Rosse**, Omaha, Neb.; **D. C. Boughton**, technical advisor, Animal Industry Products, DuPont Co.; **Frank Staedtler**, field assistant, head cattle buyer, Armour and Co.; **A. Z. Baker**, president, American Stockyards Association; and **A. L. Olson**, president, South St. Paul stockyards.

During the business session, the following officers were elected: Dr. Fred O'Flaherty, Cincinnati, Ohio, president; Mr. Frank Knutson, Chicago, Ill., first vice-president; Dean H. H. Kildee, Ames, Iowa, second vice-president; Mr. Wilbur Coulter, Chicago, secretary; and Mr. Fred Hatch, Chicago, treasurer.

American College of Veterinary Pathologists Announces Examination

The American College of Veterinary Pathologists announces that applicants for the 1954 examination should have complete application forms in the hands of the secretary-

treasurer of the organization three weeks prior to the 1954 AVMA meeting in Seattle (Aug. 23-26). This means that applications must be received on or before Aug. 1, 1954. The time and place of the examination to be given for approved candidates will be announced later. For further information and application forms write to the secretary-treasurer, Lt. Col. T. C. Jones, Armed Forces Institute of Pathology, 7th St. and Independence Ave. S. W., Washington 25, D. C.

STUDENT CHAPTER ACTIVITIES

Iowa Chapter.—The Iowa State College Student Chapter of the AVMA installed the following officers at their annual winter smoker on February 10: William Thomas, junior class, president; Glen Barrington, senior, vice-president; Gussell Simonsen, sophomore, secretary; and Stanley Romans, senior, critic. James Creel, junior, is president-elect and will assume his duties at the beginning of the 1954-1955 school year.

Entertainment at the smoker consisted of a short skit by Sigma Kappa, social sorority, and numerous acts by a magician, Francis Francois, a student from the engineering division of the College. The masters of ceremonies were John Crawley and John Conley. *s/Howard E. Bayles, Retiring Secretary.*

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Kansas Chapter.—The Kansas State College Student Chapter of the AVMA has enjoyed a successful fall semester and is looking forward to the spring semester with much enthusiasm.

Highlighting the social calendar will be the annual spring banquet and formal to be held May 7. The biannual exchange visit of the Oklahoma A. & M. veterinary students to our campus will also take place this spring but no date has been set as yet.

In keeping with the policy of senior student speakers relating their experiences of summer employment, enjoyable talks have been given by Francis Kaisier, Charles Schnitzler, Otto Shill, Clial McDonald, Don Shuman, and Mel Worthington since the last report.

The guest speaker for the evening of December 1, was **Dr. M. L. Morris**, a consultant in animal nutrition from Topeka, who passed out papers entitled, "Clinical Laboratory Diagnostic Procedures," upon which his talk was based. **Dr. J. E. Luckroth**, of Seneca, gave an interesting and enlightening talk on establishing a poultry practice, at the meeting on December 15. "Dispensing Problems" was the topic of Guest Speaker **Dr. Harris**, of Norden Laboratories, on the evening of February 2.

New officers for the spring semester are: Norman Meriweather, president; William Kvasnicka, president-elect; Jay Rush, vice-president; Raymond Russell, secretary; Frederick Day,



Dr. Wade O. Brinker (right), East Lansing, Mich., professor of surgery at the School of Veterinary Medicine, Michigan State College, receives his "Fido" (dogdom's equivalent of Hollywood's Oscar) as veterinarian of the year, from Mr. Harry Miller, director of the Gaines Dog Research Center, at ceremonies in the New York Athletic Club. Dr. Brinker was voted the honor in a nation-wide poll conducted by the Center, for his outstanding contribution in the field of canine surgery, notably in bone work and repair techniques of fractures.

marshall; James Benedict, critic; and Walter Gier, treasurer.

S/JOE LANDHOLM, *Publicity Chairman.*

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Ontario Chapter.—On January 29, the Ontario Veterinary College Student Chapter of



Left to right—Mr. Lance Rumble, guest speaker; Dr. J. A. Henderson, faculty advisor; and Mr. Bill Dale, winner of the AVMA student award.

the AVMA held its annual banquet. Greetings were extended on behalf of the AVMA by Dr. T. Lloyd Jones, principal, who then introduced the guest speaker, **Mr. Lance Rumble**, a well-known Toronto figure and a breeder of Hackneys. The AVMA student award, for outstanding sportsmanship, scholastic ability, extracurricular activities, and personality, was presented to William Dale, Schomberg, Toronto. Dr. J. A. Henderson, of the faculty, made the presentation.

In connection with the banquet, the College also held open house for its guests.

S/HAROLD C. GIBBS, *President.*

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Pennsylvania Chapter.—At the Dec. 18, 1953, meeting of the University of Pennsylvania Student Chapter of the AVMA, the following officers were elected: Hugh Edmonds, president; Bernard G. Levine, president-elect; Jack Munnel, secretary; and Charles Garvin, treasurer.

Following the election of officers, Mr. Kirceval, manager of Sagamore farm, discussed training, breeding, and management of Thoroughbreds.

S/BERNARD G. LEVINE, *Retiring Secretary.*

WOMEN'S AUXILIARY

A Message from the President.—The thirty-seventh annual meeting of the Women's Auxiliary to the AVMA will be held in Seattle, Wash., Aug. 23-26, 1954. The Roosevelt Hotel will be our Auxiliary headquarters and many of our meetings will be held there. Mrs. D. W. Clarke, Seattle, and Mrs. T. R. Phelps, Vancouver, B. C., are co-chairmen of activities for women. May I suggest that you read the AVMA JOURNAL carefully for plans and details.

This has been a very busy year in Auxiliary affairs. A great many things have been accomplished to date but there is much still to be done before the annual meeting. To assist selected veterinary students with loans and awards has truly been one of our objectives during the last few years. During the 1951-1952 year 12 loans were made, totaling \$4,800. There were 39 requests for loans in 1952-1953. Twelve loans were made, totaling \$3,800, and this exhausted our fund. So far this year, two loans have been made, one for \$250, the other for \$400. There are two more requests being processed now.

Last year, the auxiliaries contributed \$450 to the loan fund. So far this year, 23 auxiliaries have contributed more than \$700 to the fund. At present, we have \$925 on loan. With the return of principal and interest, and the continued contributions from auxiliaries and friends, our loan fund will continue to be available for senior students. We have loans now in ten of the 19 veterinary schools.

Our membership at present is over 3,600. We are very pleased with our steady growth. However, considering the large number of veterinarians (there are over 18,000 in the U. S. and Canada), our membership could be, and should be, much larger. Our Auxiliary needs the interest and cooperation of every veterinarian and every veterinarian's wife. During the past two years, our membership increased 50 per cent. We would like to do even better in the next two years.

It has been my privilege to make official visits to several state auxiliaries. I am truly sorry I could not accept all of the invitations extended to me. Time and distance were the deciding factors.

There have been a number of regional auxiliaries organized this year. The executive board of the Auxiliary is indeed pleased to welcome these new groups. We hope you will meet our constitutional requirement which is: Article 4, Section 4—"No Auxiliary may be affiliated unless it maintains a full corps of officers who are members in good standing in this Auxiliary." One representative from each constituent affiliate makes up our legislative body, the house of representatives.

I have enjoyed working with all of you. Thank you for all of your fine, friendly letters. I shall look forward to meeting many of you in Seattle.

S/(MRS. R. A.) LAURA RUNNELLS, *President.*

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Indiana Auxiliary.—At the annual meeting

No invitation is necessary to become a member of the Women's Auxiliary to the AVMA. We welcome all interested women. The dues are only \$1.00 per year. Just write to:
Mrs. C. M. Rodgers, Secretary, Blandinsville, Ill.

of the Women's Auxiliary to the Indiana Veterinary Medical Association in Indianapolis on Jan. 13-15, 1954, the following officers were elected: Mrs. L. M. Hutchings, Lafayette, president; Mrs. G. R. Burch, New Augusta, first vice-president; Mrs. E. S. Weisner, Goshen, second vice-president; Mrs. Galen Krill, Boswell, secretary; Mrs. V. F. Saylor, Zionsville, treasurer; Mrs. J. Axby, Indianapolis, historian; Mrs. F. A. Hall, Lafayette, delegate; and Mrs. O. B. Curry, Morristown, alternate.

s/MRS. GALEN KRILL, *Secretary.*

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Kansas Auxiliary.—The twentieth annual meeting of the Women's Auxiliary to the Kansas Veterinary Medical Association was held at the Hotel Broadview in Wichita, Jan. 17-19, 1954.

At the business meeting, the following projects for 1954 were adopted: (1) to present a gift to the new veterinary hospital a Kansas State College; (2) to reestablish the practice of contributions to the national Student Loan Fund; and (3) to make an organized effort to increase membership. The following officers were elected: Mrs. M. F. Scoby, McPherson, president; Mrs. F. B. Ogilvie, Kansas City, vice-president; Mrs. A. W. Brecheisen, Garnett, secretary-treasurer; and Mrs. Ernest Boley, Wichita, reelected historian.

The social activities included a buffet supper at which Dr. E. J. Frick told some of the highlights of his European tour, brunch, banquet and dance, and the annual luncheon.

s/MRS. GEORGE ALLEN, *Reporter.*

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Louisiana Auxiliary.—The annual meeting of the Women's Auxiliary to the Louisiana Veterinary Medical Association was held Feb. 2, 1954, in Baton Rouge, ending a most successful

year under the leadership of Mrs. Chester A. Paige, president for 1953-1954. The Auxiliary has an active membership of 53. Twenty-seven names were added to the national Auxiliary this year making a total of 57 from the state. Mrs. W. T. Oglesby, delegate to the national convention in Toronto, reported on that meeting.

Officers elected for the coming year are: Mrs. Howard Smythe, Lake Charles, president; Mrs. Glen W. Hunt, Opelousas, vice-president; and Mrs. E. E. Saulmon, Baton Rouge, secretary-treasurer.

The Auxiliary makes an annual contribution to the Research Fund of the AVMA and an annual award to an outstanding Louisiana student of veterinary medicine at Texas A. & M. College.

s/(MRS. E. E.) CATHARINE SAULMON, *Secretary.*

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Maine Auxiliary.—At the January 13 meeting of the Women's Auxiliary to the Maine Veterinary Medical Association in Augusta, the following officers were elected: Mrs. James A. Elliott, Bangor, reelected president; Mrs. Grant Savage, Waterville, vice-president; and Mrs. Philip Brown, Belfast, secretary-treasurer. Mrs. Raymond Libby, Richmond, reported on the meeting of the national Auxiliary in Toronto.

s/MRS. PHILIP BROWN, *Secretary.*

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Minnesota Auxiliary.—The annual meeting of the Women's Auxiliary to the Minnesota State Veterinary Medical Society was held Jan. 25-27, 1954, in the St. Paul Hotel. Mrs. R. A. Runnels, president of the national Auxiliary, was the guest of honor. She explained the various projects of the national Auxiliary, with special emphasis on the Student Loan Fund and the Student Awards. Mrs. R. A. Merrill, St. Paul, gave a report of the Auxiliary meeting in Toronto; and Mrs. H. E. Schwermann, New



Members of the executive board of the Minnesota auxiliary are (left to right): Mrs. H. E. Schwermann, Mrs. Lee Railsback, Mrs. Russell A. Runnels, president of the Women's Auxiliary of the AVMA and guest of honor at this state meeting; Mrs. D. E. Trump, Mrs. E. H. Gloss, and Mrs. A. Schladweiler.

Ulm, reported on the progress of the Radio Public Information Program of the AVMA in Minnesota; nineteen stations are now broadcasting this information. The group voted to contribute \$75 to the Student Loan Fund.

Social activities included an Indian tea, a demonstration "Beauty with Lighting," a banquet, and dance.

The following officers were elected for 1954: Mrs. D. E. Trump, Owatonna, president; Mrs. W. L. Boyd, St. Paul, first vice-president; Mrs. E. H. Gloss, Gaylord, second vice-president; Mrs. A. J. Schladweiler, Madison, secretary; and Mrs. Lee Railsback, Ellsworth, treasurer.

S/MRS. H. E. SCHWERMANN, *Retiring President.*

APPLICATIONS

Applicants — Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative By-Laws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., the names of applicants residing within the jurisdictional limits of the constituent associations shall be published once in the JOURNAL.

The following applicants have been certified as members of the constituent association that has jurisdiction over the area in which the applicant resides. This certification was made by the secretary of the constituent association in accordance with Section 2, Article X, of the Administrative By-Laws.

BARSKY, DAVID

16 Willowdale Ave., Port Washington, N. Y.
D.V.M., New York State Veterinary College,
1935.

BEHAN, J. A. T.

30 Albert St., N., Orillia, Ont.
D.V.M., Ontario Veterinary College, 1946.

BURMESTER, BEN R.

U. S. Regional Poultry Research Laboratory,
Box 270, East Lansing, Mich.
D.V.M., Michigan State College, 1951.

KING, STANLEY

2019 East 78th St., Minneapolis, Minn.
D.V.M., Iowa State College, 1949.

MACDONALD, DONALD R.

2090 Wyandotte St., East, Windsor, Ont.
D.V.M., Ontario Veterinary College, 1942.

RYNCARZ, ALEXANDER J.

529 S. 106th, Tacoma, Wash.
D.V.M., Washington State College, 1944.

Applicants — Not Members of Constituent Associations

In accordance with paragraph (b) of Section 2, Article X, of the Administrative By-Laws, as revised at the annual meeting of the House of Representatives, Aug. 18, 1951, in Milwaukee, Wis., notice of all applications from applicants residing outside of the jurisdictional limits of the constituent associations, and members of the Armed Forces, shall be published in the JOURNAL for two successive months. The first notice shall give the applicant's full name, school, and year of graduation, post office address, and the names of his endorsers.

First Listing

HINEMAN, RICHARD E.

901st Medical Detachment, V.F.I.L., APO 122,
c/o P.M., New York, N. Y.

D.V.M., Kansas State College, 1943.

Vouchers: L. W. Turner and W. D. Donovan.

SABBAN, MOHAMMED SAID EL

St. No. 9, Villa No. 60, Cairo, Egypt.

D.V.M., M.V.Sc., University of Cairo, Egypt,
1940.

Vouchers: A. H. El Dardin and J. E. Aghion.

Second Listing

ANTHONY, WALLACE L.

4735 E. Marginal Way,
6006 ASU., Vet. Detach., Seattle, Wash.

LIEBERMAN, JAMES

3426 Tulane Dr., West Hyattsville, Md.

MALDONADO, GUILLERMO

Calle 75, No. 22-20,
Bogota, Colombia, S.A.

ROJAS, MAXIMO G.

Hotel Junin, Ganadera Dept.,
La Oroya, Lima, Peru.

WITTROCK, JACK E.

316 Haight, Alameda, Calif.

U. S. GOVERNMENT

Veterinary Personnel Changes.—The following changes in the force of veterinarians in the U.S.D.A. Agricultural Research Service are reported as of Feb. 19, 1954.

NEW APPOINTMENTS

Leslie E. Bay, Kansas City, Kan.

Jasha L. Glasser, New York, N. Y.

William B. Grene, Omaha, Neb.

Milford L. Gunnels, Columbia, S. Car.

Lester Johnson, Fort Worth, Texas.

Howard M. Jones, St. Louis, Mo.

Jokubas Kregzde, Cincinnati, Ohio.

Mason L. Matthews, Jr., San Antonio, Texas.

Kenneth B. Middleton, Kansas City, Kan.

Tadas Palionis, Milwaukee, Wis.

Jack S. Palmer, San Francisco, Calif.

Norman R. Piersma, East Lansing, Mich.

Louis Polansky, Boston, Mass.

Robert N. Richardson, Denver, Colo.

Lyle V. Russell, Topeka, Kan.

Moses A. Simmons, Omaha, Neb.

Richard J. Smith, Spokane, Wash.

Janis Sprincis, Milwaukee, Wis.

Ray Surplus, Salt Lake City, Utah.

Martin J. Tillery, Raleigh, N. Car.

Antanas, Valiuskis, Ottumwa, Iowa.

William L. Wake, Richmond, Va.

William J. Waters, Jr., Suffolk, Va.

James F. Wright, Greenport, L. I.

DEATHS

Howard L. Darby, Fort Worth, Texas.

Floyd E. Wilson, Fort Worth, Texas.

RESIGNATIONS

Henry Birne, New York, N. Y.

Jonas R. Brooks, Fort Worth, Texas.

J. Warren Detweiler, Philadelphia, Pa.

George S. Jones, Atlanta, Ga.

Charles C. Lawrence, Olympia, Wash.

Ernesto Lopez, San Juan, P. R.

LaRoy Noyes, Fayetteville, Ark.

Primo Jack Piovesan, Olympia, Wash.

Walter A. Schuehle, Mexico City, Mex.
Morgan W. Tempero, Ottumwa, Iowa.

SEPARATION

George L. Severs, Davenport, Iowa.

TERMINATIONS

Cornelius A. DeValois, Tampa, Fla.
John T. DoRan, Lincoln, Neb.
Alvin D. Rees, Mexico City, Mex.
Franklin H. Suits, Tampa, Fla.

RETIREMENT

Guy E. Abrams, Portland, Ore.

MILITARY FURLoughS

Sidney Feinberg, Newark, N. J.
John D. Galbreath, Fort Worth, Texas.
Norman J. Glucksman, Newark, N. J.

TRANSFERS

Paul Becton, from Jackson, Miss., to Columbus, Ohio.
Edward R. Betlach, from Bismarck, N. Dak., to Portland, Ore.

Don R. Bowers, from Jacksonville, Fla., to Baton Rouge, La.

Ben A. Brinkman, from Springfield, Ill., to Denver, Colo.
Salvatore Corridore, from New York, N. Y., to Newark, N. J.

Erston S. Cox, from Phoenix, Ariz., to Jefferson City, Mo.

Donald E. DeTray, from Washington, D. C., to Beltsville, Md.

Frederic W. Hansen, Jr., from Denver, Colo., to Montpelier, Vt.

Martin Kagan, from Clayton, N. Y., to Alexandria Bay, N. Y.

Harold C. King, from Trenton, N. J., to Des Moines, Iowa.

William W. McMichael, from Portland, Ore., to Des Moines, Iowa.

Clifton A. Niles, from Montpelier, Vt., to Charleston, W. Va.

Eric H. Nordstrum, from Des Moines, Iowa, to St. Paul, Minn.

William M. Petersen, from Sacramento, Calif., to Olympia, Wash.

Ted Rea, from Fort Worth, Texas, to Phoenix, Ariz.

Wilbur L. Rehkemper, from Charleston, W. Va., to Lansing, Mich.

James H. Sikes, Jr., from Little Rock Ark., to Atlanta, Ga.

Louis E. Stilley, from Oklahoma City, Okla., to Fort Worth, Texas.

CORRECTION of Transfer

Ross W. Gerding, from Buffalo, N. Y., to Alexandria Bay, N. Y.

AMONG THE STATES AND PROVINCES

Alabama

Dr. Cole Presents Herzfeld Lecture.—Dr. C. R. Cole, chairman of the Department of Pathology, College of Veterinary Medicine, Ohio State University, presented the third Herzfeld Lecture for the School of Veterinary Medicine, Alabama Polytechnic Institute on Feb. 18, 1954. The lecture was entitled "Toxoplasmosis of Domestic Animals." Each of the several schools of the Alabama Polytechnic Institute has the opportunity to invite an outstanding person in that particular area of work to deliver the Herzfeld Lecture each year for the students, staff, and invited guests of the school.

California

Officers of State Association.—The following officers were elected at the mid-winter conference of the California State Veterinary Medical Association on Jan. 25-27, 1954: Drs. Paul D. DeLay, Sacramento, president; E. G. LeDonne, Oakland, treasurer; Mr. Charles S. Travers, San Francisco, executive secretary; Drs. W. J. Zontine, Lancaster, first vice-president; A. M. McCapes, San Luis Obispo, second vice-president; A. Mack Scott, Long Beach, third vice-president; and Charles D. Stafford, Novato, executive committee.

The meeting was highly successful, with a record attendance of 378 members of the California Association.

S/CHARLES S. TRAVERS, Executive Secretary.

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Central Association.—The last regular meeting of the Central California Veterinary Medical Association was held in the Hotel Johnson in Visalia in November, 1953. After three films were shown, Dr. Albert L. Tietze of Bakersfield discussed the use of radioactive strontium in cander eye of cattle, and general beef practice.

Colorado

Death of Dr. Farquharson.—Dr. James Farquharson (COL '21), who suffered an attack of coronary thrombosis last October, passed away at the home of his son, Bruce (COL '52), in Phoenix, Ariz., on March 11. Details will appear in the May JOURNAL.

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Annual Conference.—The School of Veterinary Medicine, Colorado A. & M. College, presented its fifteenth annual Conference for Veterinarians on Feb. 15-17, 1954. The conference was the most successful, both as to the attendance and enthusiasm shown, since the annual conference was instituted in 1937.

There were 250 registered veterinarians with 22 states represented; 300 attended the banquet and dance on Tuesday evening, and 214 veterinarians attended the "question-box luncheon" Tuesday noon. The luncheon was an innovation this year and, because of the enthusiasm with which it was received, will probably be made a permanent feature of the annual conference.

Distinguished guests in attendance were Dr. A. H. Quin, president-elect of the AVMA, and Brig. Gen. Wayne O. Kester, V.C., U.S. Air Force.

The following guest speakers also appeared on the scientific program: Drs. Robert C. Bay, University of Utah Medical School, Salt Lake City; Wayne Binns, Utah State School of Agriculture, Logan; John F. Christensen, University of California, School of Veterinary Medicine, Davis; Paul V. Christofferson, Provo, Utah; W. S. Gochenour, Pitman-Moore Co., Indianapolis, Ind.; C. Edwin Hofmann, Tulsa, Okla.; James L. Palotay, Greeley; W. E. Peterson (Ph.D.), University of Minnesota, St. Paul; M. N. Rie-

menschneider, state veterinarian, Denver; **Vyrle D. Stauffer**, Arvada; **Captain William H. Sudduth**, Hill Air Force Base, Utah; and **Eli Von Tour**, Alliance, Neb.

Members of the College who participated in the program were: **Drs. O. R. Adams, Maxine Benjamin, Theodore H. Belling, Jr., Nicholas H. Booth, Floyd Cross, Robert W. Davis, Glenwood P. Epling, H. J. Hill, W. V. Lumb, Lloyd C. Moss, Elwood L. Nye, Robert H. Udall, and L. Keith Wayt.**

s/O. R. Adams, Director of Veterinary Clinics.

District of Columbia

District Association.—The District of Columbia Veterinary Medical Association held its first quarterly meeting for 1954 at the Army Medical Graduate School, Walter Reed Hospital, on January 19. The following officers were installed for the ensuing year: Dr. A. K. Kuttler, president; Lt. Col. T. C. Jones, first vice-president; Dr. I. G. Cashell, second vice-president; and Dr. William C. Patterson, secretary-treasurer.

A panel discussion on "The Leptospiroses" was presented by **Lt. Col. R. H. Yager, Lt. Col. Chester A. Gleiser**, and **Dr. Robert J. Byrne**.

s/WILLIAM C. PATTERSON, Secretary.

Georgia

Atlanta Society.—At a recent business meeting of the Atlanta Veterinary Society, the following officers were elected: **Drs. E. R. Griner, president; C. C. Rife, vice-president; and C. L. Bromley, Jr., secretary-treasurer.**

The Atlanta Veterinary Society meets regularly on the second Tuesday of every month. At the previous scientific session, **Mr. T. W. McGeever**, district supervisor, Federal Bureau of Narcotics, discussed the uses and abuses of narcotic laws.

s/C. L. BROMLEY, JR., Secretary.

Illinois

Chicago Society.—The Chicago Veterinary Medical Society met at the Palmer House on Tuesday evening, Jan. 12, 1954.

After hearing reports of the several committees, the following officers were elected for 1954: **Drs. R. J. Cyrog, president; H. M. Moe, president-elect; W. H. Riser, secretary; H. W. Boothe, treasurer.** Elected to the board of governors were **Drs. J. M. Gillespie, E. C. Saunders, and C. H. Armstrong.**

Dr. R. C. Glover, the outgoing president, presented the Society with a check for \$100 to be used in securing program speakers for the coming year.

Dr. R. C. Klussendorf, Terre Haute, Ind., discussed the clinical uses of expandex and other plasma volume expanders.

Indiana

State Association.—The highly successful seventieth annual meeting of the Indiana Veterinary Medical Association was held at the Severin Hotel, Indianapolis, on Jan. 13-15, 1954, Dr. E. W. Spieth, Jeffersonville, presiding. The interesting and instructive program was presented by Association members and out-of-state speakers.

Dr. E. S. Weisner, Goshen, received the gavel from Dr. Spieth, and officers elected for the coming year were: **Drs. Roe King, Sheridan, president-elect; J. E. Jordan, Indianapolis, vice-president; W. W. Garverick, Zionsville, secretary-treasurer; J. L. Kixmiller, Indianapolis, resident secretary to the AVMA; Paul Little, Columbus, director from ninth district; G. E. Dershem, Roann, director from Wabash Valley Association; H. D. Cain, Carmel, director from Central Indiana Association; and F. H. Brown, Indianapolis, director from the commercial firms.**

Guests from other states who addressed the convention were **Brig. Gen. James A. McCaliam**, Washington, D. C. president of the AVMA; **Col. John H. Rust**, University of Tennessee, Oak Ridge; **Drs. W. O. Brinker**, Michigan State College, East Lansing; **Howard W. Dunne**, Pennsylvania State University, State College; **Walter J. Gibbons**, Alabama Polytechnic Institute, Auburn; **R. B. McClelland**, Buffalo, N. Y.; **W. R. McGee**, Haggard, Davidson & McGee, Lexington, Ky.; **Earl N. Moore**, Ohio Agricultural Experiment Station, Wooster; **Dennis Sikes**, University of Tennessee, Knoxville; and **R. E. Witter**, University of Illinois, Urbana.

Association members who participated were: **Drs. D. D. Baker, L. M. Borst, Joe W. Green, R. J. Hoskins, T. K. Jones, and J. F. Jordan**, Indianapolis; **H. M. Bratt, Sr., H. M. Bratt, Jr., R. C. Klussendorf**, and **H. D. Owen**, Terre Haute; **J. F. Bullard, A. L. Delez, and L. P. Doyle**, Lafayette; **G. R. Burch and C. J. York**, Zionsville; **L. E. Andres**, Remington; **S. E. Bowman**, Odon; **J. E. Carver**, Michigan City; **L. A. Clark**, Bedford; **G. E. Krill**, Boswell; **H. D. Lidikay**, Darlington; **G. R. Oldham**, Kokomo; **E. W. Spieth**, Jeffersonville; **T. L. Steenerson**, Wilkinson; and **N. A. Turner**, Wabash.

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Michiana Association.—The Michiana Veterinary Medical Association met in South Bend on Feb. 11, 1954. Dr. U. D. Petschulat, La Grange, who formerly was with the Upjohn Company, spoke of the application of ECP and cortisone in veterinary practice. The subject was well handled and a good discussion followed. The following officers were elected: **Drs. Harry J. Magrane, Jr., Mishawaka, president; Donald D. Ramsey, La Porte, president-**

elect; J. J. Fishler, Elkhart, vice-president; and Paul W. Hough, South Bend, secretary-treasurer. Dr. Allen Winter, Benton Harbor, Mich., the retiring president, presented Incoming President Magrane with a gavel embossed with a veterinary caduceus and a matched wooden box to carry it.

s/J. L. KIXMILLER, Resident Secretary.

Northeastern Association.—On February 9, the Northeastern Indiana Veterinary Medical Association met in Butler to hear Dr. William F. Pritchard of Purdue University discuss ketosis and milk fever. A lively discussion followed.

The women were entertained by Mrs. Eber Allen of Fort Wayne. The Hosts were Dr. and Mrs. E. V. Blume of Butler and Dr. and Mrs. C. R. Baumgartner of Spencerville.

s/J. L. KIXMILLER, Resident Secretary.

Tenth District Association.—The Tenth District (Ind.) Veterinary Medical Association met in Cumberland on Feb. 18, 1954, to hear Dr. Lee Johnson, College of Veterinary Medicine, Ohio State University, discuss surgical procedures in large and small animals.

Officers of this association are Drs. R. E. Miller, Richmond, president; F. O. Gossett, Greenfield, vice-president; R. S. Ensign, New Castle, secretary-treasurer; and E. C. Eichhorn, Middletown, elected to the board of directors.

Dr. and Mrs. R. A. Showalter were hosts.

s/J. L. KIXMILLER, Resident Secretary.

Wabash Valley Association.—The Wabash Valley Veterinary Medical Association met in Wabash on February 10. Dr. Harold Moses, of Purdue University, spoke on the importance veterinarians can play in handling diseases of poultry.

Dr. and Mrs. N. A. Turner and Dr. and Mrs. Myers of Wabash were hosts.

s/J. L. KIXMILLER, Resident Secretary.

Iowa

Officers of Southeast Iowa Association.—The following officers have been elected to serve the Southeast Iowa Veterinary Medical Association for 1954: Drs. George Swift, Fort Madison, president; Al Raun, Ottumwa, vice-president; and W. J. Kilpatrick, Mediapolis, secretary-treasurer.

s/W. J. KILPATRICK, Secretary.

Kansas

State Association.—The fiftieth annual convention of the Kansas Veterinary Medical Association was held at the Hotel Broadview in Wichita on Jan. 17-19, 1954.

The following speakers presented papers at the scientific session: Drs. W. W. Armistead, dean, School of Veterinary Medicine, A. & M. College of Texas, College Station; Victor J.

Cabasso (Sc.D.), Lederle Laboratories Division, American Cyanamid Co., Pearl River, N. Y.; Robert D. Courter, assistant chief, Veterinary Public Health Section, Communicable Disease Center, U. S. Public Health Service, Atlanta, Ga.; Mack A. Emmerson, School of Veterinary Medicine, Iowa State College, Ames; E. J. Frick, School of Veterinary Medicine, Kansas State College, Manhattan; W. S. Gochenour, Pitman-Moore Co., Indianapolis, Ind.; E. E. Leasure, dean, School of Veterinary Medicine, Kansas State College, Manhattan; Deets Pickett, Kansas City, Mo.; William F. Riley, Jr., School of Veterinary Medicine, Michigan State College, East Lansing; Clarence Schmidt, Worthington, Minn.; and William M. Thies, Jr., Hillsboro.

At the business session, the following officers were elected: Drs. Frank W. Jordan, Abilene, president; Marvin J. Twiehaus, Manhattan, vice-president; K. Maynard Curts, reelected secretary-treasurer. The following trustees were also elected: Merle L. Henrikson, Emporia, three-year term as trustee-at-large; district trustees (for 1-year term): Western, Darrell C. Phillips, Wakeeney; Central, Ray S. Pyles, Wichita; Northeast, Jacob E. Mosier, Manhattan; and Southeast, Buford D. Winters, Chanute. Other members of the board of directors and their terms of office are: Drs. J. S. Haley (past-president), Topeka, one year; Wm. M. Thies, Jr., Hillsboro, one year; and F. B. Ogilvie, Kansas City, two years. Drs. F. L. Hart and J. F. Knappenberger were appointed delegate and alternate, respectively, extending their terms another year, and Dr. K. M. Curts was re-nominated as AVMA resident secretary.

s/K. MAYNARD CURTS, Resident Secretary.

Louisiana

Conference for Veterinarians.—The twenty-third annual conference for veterinarians of Louisiana, conducted by the Department of Veterinary Science of the Louisiana State University, was held Feb. 2-4, 1954, with approximately 85 veterinarians in attendance.

Guest speakers on the program were: Drs. W. W. Armistead, dean, School of Veterinary Medicine, Texas A. & M. College, College Station; John Blunschi, Ferriday; H. A. Burton, Alexandria; H. B. Elliott, director, State Livestock Sanitary Board diagnostic laboratory, Baton Rouge; Robert D. Franks, Shreveport; M. K. Jarvis, Corn States Serum Co., Omaha, Neb.; J. L. Melancon, Bunkie; Willard Pounds, New Orleans; Leo Pfrimmer, Franklinton; Lester Proctor, Oelwein, Iowa; E. E. Saulmon, Baton Rouge; S. F. Scheidy, Sharp & Dohme, Philadelphia, Pa.; and F. B. Wheeler, state veterinarian, Baton Rouge.

Faculty members of the Louisiana State University who participated in the program were: Drs. Lon E. Foote, R. B. Lank, R. L. Mayhew,

W. T. Oglesby, head, Department of Veterinary Science; **Walter Peevy, A. B. Watts, Mrs. Georgina N. Bradley, Mr. J. G. Lee, Jr.**, dean, College of Agriculture; **Miss Helen E. Levy, and Mrs. Betty J. Torbert**.

s/W. T. OGLESBY.

Maine

Officers of State Association.—At the January 13 meeting of the Maine Veterinary Medical Association, the following officers were elected: Drs. Raymond Larcom, Portsmouth, N. H., president; J. A. Elliott, Bangor, vice-president; and J. F. Witter, Orono, secretary-treasurer. The new executive board is composed of Drs. P. R. Brown, Belfast; E. C. Moore, Turner Center; and R. R. Monahan, Brunswick. Dr. H. L. Chute, Orono, was nominated as resident secretary of the AVMA.

s/J. F. WITTER, *Secretary*.

Massachusetts

State Association.—At the regular monthly meeting of the Massachusetts Veterinary Association in the Hotel Beaconsfield, Brookline, on February 17, Dr. Edgar W. Tucker, Concord, discussed bovine mastitis, from the practitioner's viewpoint.

The officers for 1954 are Drs. R. H. Bruce, Dedham, president; C. M. deVarennes, Quincy, first vice-president; P. R. Granholm, second vice-president; and C. L. Blakely, Needham, secretary-treasurer. Dr. L. A. Paquin is resident secretary.

s/C. L. BLAKELY, *Secretary*.

Michigan

Southeastern Association.—The Southeastern Michigan Veterinary Medical Association met at Beauchamp's restaurant near Woodward on February 11. The program consisted of a panel discussion, with Dr. Jerry Hergott as moderator, and the following participants: Drs. Charles Hodder, distemper; Louis Rossoni, hard pad disease; Richard Pearce, leptospirosis; and O. D. Dickinson, infectious hepatitis.

The following officers were elected at the January meeting: Drs. Steve Kelly, Detroit, president; Jerry Hergott, Dearborn, vice-president; Gilbert Meyer, Detroit, secretary; Charles Hodder, Detroit, treasurer; and A. W. Emery, Waterford, director.

s/GILBERT MEYER, *Secretary*.

* * *

Death of Dr. L. H. LaFond.—Dr. Louis H. LaFond, 62, former prominent small animal practitioner of Detroit, died in Pigeon, Mich., on Feb. 14, 1954, after a prolonged illness. A charter member of the American Animal Hospital Association, he had disposed of his practice several years ago, following which he served as hospital inspector for the A.A.H.A. on a part-time basis. He also served as track

veterinarian at some of the Thoroughbred and trotting tracks in Michigan during the racing season.

Born at Park Hill, Ont., in July, 1892, Dr. LaFond received his preliminary education at Ferris Institute and then entered Michigan State College from which he received his D.V.M. degree in 1923. Always active in local, state, and national veterinary association work, he had served in various capacities including that of president of the A.A.H.A. in 1939-1940, co-vice general chairman of the committee on local arrangements for the AVMA convention in Detroit in 1949, and various committee assignments for the two associations. At the time of his death, he was a member of the AVMA special committee on standards for veterinary hospitals. He had been a member of the AVMA for thirty-one years, having joined immediately upon graduation from veterinary school.

He is survived by his widow, Mrs. Emma LaFond.

Missouri

State Association.—The sixty-fourth annual convention of the Missouri Veterinary Medical Association was held in the Hotel Continental in Kansas City on Feb. 22-23, 1954.

The following speakers participated in the program: Drs. Dan J. Anderson, Fort Worth, Texas; W. O. Brinker, School of Veterinary Medicine, Michigan State College, East Lansing; Francis T. Candlin, Denver, Colo.; Thomas M. Eagle, Parkville; A. D. Glover, Canton; A. H. Groth, dean, School of Veterinary Medicine, University of Missouri, Columbia; Leslie E. McDonald, School of Veterinary Medicine, Oklahoma A. & M. College, Stillwater; W. H. Mowder, Independence; Carl Olson, University of Nebraska, Lincoln; E. R. Price, Missouri Division of Health, Jefferson City; A. H. Quin, Kansas City, president-elect of the AVMA; Lee T. Railsback, Ellsworth, Minn.; L. A. Rosner, state veterinarian, Jefferson City; Dan B. Russell, Russell Laboratories, Kansas City; Charles J. York, Pitman-Moore Co., Indianapolis, Ind.; and Mr. Kenneth B. Haas, Sr., co-author of "Business Practices in Veterinary Medicine," Chicago, Ill.

s/PAUL L. SPENCER, *Secretary*.

* * *

Kansas City Association.—On Feb. 2, 1954, the Kansas City Veterinary Medical Association met at the Continental Hotel. Guest Speaker R. E. Lubbenhusen, of the Ralston Purina Company in St. Louis, discussed the latest developments in research of deficiency diseases of livestock.

s/J. C. DAVIS, *Secretary*.

Nevada

State Association.—The annual meeting of the Nevada State Veterinary Medical Association was held in Reno on Feb. 5-6, 1954.

The program speakers were: **Drs. John L. O'Harra**, State Department of Agriculture, Reno; **William E. Steinmetz**, Sacramento, Calif.; and **F. R. Mencimer**, Ogden, Utah.

During the business session, the following officers were elected: Drs. Jack R. Pitcher, Minden, president; E. E. Maas, Reno, vice-president; and Edward Records, Reno, secretary-treasurer.

s/EDWARD RECORDS, Secretary.

New Jersey

Dr. Ticehurst Honored.—Dr. Harry Ticehurst (NYA '04), 82, of Red Bank, one of the



Dr. Harry Ticehurst (center) is greeted by Governor Robert S. Meyner (left) and Dr. Amos Stults (right).

oldest practitioners of veterinary medicine in New Jersey, received a citation and honorary membership in the Veterinary Medical Association of New Jersey during its seventieth annual convention.

Dr. Ticehurst served in the Veterinary Corps of the U. S. Army during World War I, rising to the rank of major. In 1919, he opened a practice in Tenafly and practiced there until 1927, when he moved to Shrewsbury. He had served for many years as treasurer of the Veterinary Medical Association of New Jersey.

The citation was conferred by Dr. Amos Stults, Hopewell, president of the Association.

* * *

State Association.—The seventieth annual meeting of the Veterinary Medical Association of New Jersey was held Feb. 4-5, 1954, at the Hotel Hildebrecht in Trenton.

The following speakers addressed the group: **Drs. I. E. Altman**, Brooklyn, N. Y.; **M. S. Arlein**, Maplewood; **E. G. Batte**, Ortho Chemical Corp., Haddonfield; **F. R. Beaudette**, Rutgers University, New Brunswick; **M. J. Bonese**, State Department of Agriculture, Mullica Hill; **C. E. Boyd**, U. S. Department of Agriculture,

Lexington, Mass.; **W. S. Gochenour**, Pitman-Moore Co., Indianapolis, Ind.; **J. B. Hagenbuch**, Princeton; **G. H. Kimnach**, Hightstown; **J. McCarthy**, West Englewood; **J. T. McGrath**, J. H. Mark, and **J. Skelley**, School of Veterinary Medicine, University of Pennsylvania, Philadelphia; **A. F. North**, Somerville; **H. C. Petree**, Flemington; **W. N. Reed**, Trenton; **J. A. Rogers**, New Bolton Farms, University of Pennsylvania, Kennett Square; **G. B. Schnelle**, Angell Memorial Animal Hospital, Boston, Mass.; **R. R. Shomer**, Teaneck; **R. E. Shope**, Rockefeller Institute for Medical Research, New York City; **O. H. Siegmund**, Merck & Co., Inc., Rahway; **J. C. Traum**, veterinary consultant, U. S. Department of Agriculture, Washington, D. C.; **A. W. Stults**, Hopewell; **Mrs. W. L. Bender**, Associated Humane Societies of New Jersey, Inc., Newark; **D. S. Benson**, State Department of Health, Trenton; **W. W. Brainard, Jr.**, president of New Jersey Coop Breeders Association, Far Hills; and **H. Miller**, director, Gaines Dog Research Center, New York City.

During the business session, the following officers were elected: Drs. John M. McCarthy, West Englewood, president; W. Philip Boyer, Morris Plains, first vice-president; Oscar Sussman, Princeton, second vice-president; John R. McCoy, New Brunswick, reelected secretary; Arthur F. North, Somerville, reelected treasurer.

A feature of the convention was "Vesta," the plastic, female Great Dane of the Gaines Dog Research Center.

The program was arranged by a committee headed by Dr. Sussman.

s/J. R. PORTEUS, Resident Secretary.

New York

American Animal Hospital Association.—The general program of the twenty-first annual meeting of the American Animal Hospital Association at the Hotel Statler, New York, May 5-8, 1954, will open on Thursday of that week with a report by **Dr. Hadley Stephenson**, Cornell Research Laboratory, on "Virus Diseases Affecting the Dog."

Under the chairmanship of Dr. Robert B. McClelland, the clinical pathology committee is preparing a two-hour television presentation and discussion, showing the value of the clinical laboratory in a small animal practice. **Dr. James Farquharson** will present, by color movies and discussion, "Practical Aspects of Plastic Surgery on the Dog" and "Review of Surgical Approach of Perineal Hernia Repair." **Dr. Mark L. Morris** will discuss the feeding of the sick dog and cat.

On Friday, May 7, the program includes a discussion by **Mr. C. T. Finn**, attorney, U. S. Fidelity and Guaranty Company, on "Legal Liability and Malpractice Problems." A panel discussion on x-ray therapy, technique, develop-

ment, and film interpretation will be headed by Dr. Myron A. Thom and other experts. Brigadier General J. A. McCallam, president of the AVMA, will discuss "The Future of the Veterinary Field."

A question and answer luncheon, with President Louis A. Corwin acting as moderator, will be held Friday noon.

The afternoon session will open with a televised demonstration of an operation for diaphragmatic hernia by Drs. Ellis Leonard and Robert P. Knowles. The remainder of the afternoon will be devoted to a panel discussion of the operation of a dog and cat hospital. The subject of "Employee and Client Relations" will be introduced by Mr. G. B. Jacobs, manager of personnel and training, General Foods Corporation. The afternoon session will continue with discussions by Dr. Charles W. Bower, B. J. Porter, Otto Stader, and James U. Norris.

The president's gala reception and banquet will be held on Friday evening.

Saturday morning will be devoted to the subject of ophthalmology, both television demonstrations and discussion being arranged by Dr. William G. Magrane. Participating with him will be Drs. L. E. Fisher, Earl J. Catcott, Leonard Krawitz, Francis T. Candlin, Harlan E. Jensen, and James E. Purnell.

Programs and cards for making hotel reservations may be had by writing to Dr. Wayne H. Riser, executive secretary, American Animal Hospital Association, 5335 Touhy Ave., Skokie, Ill.

North Carolina

Conference for Veterinarians.—The sixteenth annual conference for veterinarians, North Carolina State College and North Carolina State Veterinary Medical Association cooperating, was held Jan. 26-29, 1954, at the College in Raleigh.

The following special lecturers participated: Drs. Joseph W. Beard (M.D.), Duke University Medical School, Durham; W. L. Boyd, dean emeritus, School of Veterinary Medicine, University of Minnesota, and visiting professor in veterinary medicine at North Carolina State College; M. G. Fincher, New York State Veterinary College, Cornell University, Ithaca; R. V. Johnston, Pitman-Moore Co., Indianapolis, Ind.; Thomas J. Jones, dean, School of Veterinary Medicine, University of Georgia, Athens; T. L. Steenerson, Wilkinson, Ind.; N. B. Tennille, Oklahoma A. & M. College, Stillwater; A. H. Quin, Kansas City, Mo., president-elect of the AVMA; and J. E. Williams, U.S.D.A. Agricultural Research Service, Washington, D. C.

The following speakers from the staff of the College also assisted with the program: Drs. C. W. Barber, T. C. Blalock, L. W. Greene, J. W. Pou, and H. J. Rollins, state veterinarian, Raleigh.

At a special business meeting of the Association, 22 applicants were accepted for membership.

s/CLYDE W. YOUNG, Secretary.

Ohio

Dr. Saylor Honored.—During the annual meeting of the Ohio State Veterinary Medical Association in January, 1954, Dr. S. L. Saylor, of Canal Winchester, was awarded a bronze plaque in recognition of outstanding community service.

Dr. Saylor is the first recipient of this award, Known as the OSVMA Award for Community Service, and planned to be given annually.

Oklahoma

Dr. McDonald Joins Staff of Veterinary School.—Dr. L. E. McDonald (MSC '49) has accepted an appointment as professor and head of the Department of Physiology and Pharmacology in the School of Veterinary Medicine, Oklahoma A. & M. College at Stillwater. Dr. McDonald served in the Air Force during World War II; since 1952, he had served as associate professor in the Department of Physiology and Pharmacology, College of Veterinary Medicine, University of Illinois, Urbana.

Ontario

Ontario Veterinary Association.—The eightieth annual convention of the Ontario Veterinary Association was held at the Royal York Hotel, Toronto, on Jan. 14-16, 1954, with 400 veterinarians, wives, and friends in attendance. The business meeting exemplified the growing interest of members in their welfare, particu-



Dr. R. H. Wright, president of the Ontario Veterinary Association.

larly respecting the relationship of the veterinarian to nonveterinary governmental bodies employing veterinarians or impingeing on the conduct of veterinary practice.

The council and committees of the Association are this year headed by Dr. R. H. Wright of Dundas, Ont., who succeeds Dr. T. L. Jones as president. Dr. Wright (ONT '38) is widely known as a general practitioner and as a veterinarian actively engaged in both professional and civic affairs. He is a member of the AVMA and is presently Ontario delegate to the House of Representatives. As a member of the Canadian Club of Hamilton, Ont., as chairman of International Service, the Dundas Rotary Club, and as an active member in church life, Dr. Wright brings with him as president a wealth of experience in human affairs. His sincerity and high ideals, coupled with his experience augur well for veterinary interests in Ontario and Canada.

The following speakers appeared on the program: Drs. F. D. Horney, Joan Belcher, C. K. H. Roe, H. C. Rowsell, D. A. Barnum, and J. Archibald, of Guelph; H. Worton, Toronto; G. P. Mullen, Walkerton; V. L. Tharp, Columbus, Ohio; A. S. Greig, R. Gwatkin, L. Dzenis, and Paul Boulanger, of Hull, Que.; E. F. Pallister, N. V. Sanderson, T. Childs, G. A. Rose, K. F. Wells, of Ottawa; Grant Miserer, Chicago, Ill.; H. W. Cooper, Forrest; D. F. Damude, Milton; E. E. Ballantyne, Edmonton, Alta.; A. H. Quin, Kansas City, Mo., president-elect of the AVMA; and R. J. McDonald, Woodstock.

Officers of the Association for 1954 are: Drs. R. H. Wright, Dundas, president; R. W. Ford, Peterboro, first vice-president; C. A. V. Barker, Guelph, second vice-president; and G. A. Edge, secretary-treasurer and registrar.

s/G. A. EDGE, Secretary.

Oregon

Personal.—Dr. Gordon W. Blake (ISC '34), of Pendleton, who is with the Federal Bureau of Animal Industry in tuberculosis and brucellosis eradication, has recently been made a lieutenant colonel in the Veterinary Corps (reserve), U. S. Army. Dr. Blake is the son of Dr. A. L. Blake who is now with the California State Bureau of Animal Industry in Chula Vista.

Pennsylvania

Dr. J. F. Shigley Honored.—Dr. J. F. Shigley (COR '15) former head of the veterinary science department at Pennsylvania State College, was featured in an article in *The Centre Daily Times* of February 4, which outlined his services to the community as a member of the State College Board of Health for the past twenty-seven years. He was cited as an example of the many public-spirited citizens who

voluntarily contribute their time and energies to civic affairs and community progress in health and welfare work.

* * *

Dr. Hollister Joins Staff of Veterinary School.—Dr. Charles J. Hollister (ONT '38), an authority on the diseases of poultry and cattle, has been appointed assistant professor of veterinary medicine in the School of Veterinary Medicine, University of Pennsylvania. Dr. Hollister will be director of clinics at the University's New Bolton Center near Kennett Square, where extensive research work currently is in progress relative to the diseases of animals that may be communicated to man.

Texas

Dr. Smith Returns from Tour.—Dr. Hilton A. Smith of the Department of Veterinary Pathology, School of Veterinary Medicine, College Station, made a three-month tour of Brazil from September to November, 1953. He was invited by the Brazilian government as a "professor visitante" to visit and give lectures at Brazilian veterinary colleges. While there, he spent some time with Dr. H. H. Dukes of Cornell University, who was on a similar mission.

Virginia

Virginia and West Virginia Associations.—The Virginia and West Virginia Veterinary Medical Associations held a joint meeting at the Greenbrier Hotel, White Sulphur Springs, W. Va., Jan. 17-19, 1954. This was their first joint meeting and members of the West Virginia Association were excellent hosts and arranged a very interesting program. There were approximately 75 veterinarians in attendance, many of whom were accompanied by their wives.

The program speakers were Drs. W. L. Ingalls, Columbus Serum Co., Columbus, Ohio; Fred Kingma and V. L. Tharp, Ohio State University, Columbus, Ohio; Carl W. Groppe, Elm Grove, W. Va.; H. K. Royer, Lynchburg, Va.; John B. Healy, U. S. ARS, Richmond, Va.; N. H. Dyer (M.D.), state director of health, Charleston, W. Va.; A. F. Ranney, U. S. ARS, Washington, D. C.; W. L. Bendix, state veterinarian, Richmond, Va.; T. C. Green, state veterinarian, Charleston, W. Va.; John B. Ely and B. D. Philpy, Richmond, Va.; and Keith A. Huston (Ph.D.), Virginia Polytechnic Institute, Blacksburg, Va.

During the business session, the name of the Virginia Association was changed from Virginia State Veterinary Medical Association to Virginia Veterinary Medical Association, and the following officers were elected: Drs. R. L. Booth, Middleburg, president; J. E. Lippincott, Lynnhaven, vice-president; S. G. Eddins, Galax, president-elect; and A. J. Sipos,

secretary-treasurer. The following members were elected to the board of directors: Drs. H. K. Cooper, Roanoke; T. P. Rowe, Richmond; H. C. Newman; C. S. Milton, Winchester; A. W. Rice, Roanoke; F. E. Mullen, Harrisonburg; and J. R. Fenyk, Marion.

s/A. J. SIPOS, Secretary.

Washington

Chinchilla Research.—Chinchilla Research, under the direction of Dr. John Gorham, is being set up at Washington State College with a grant of \$16,000 from the National Chinchilla Breeders of America.—*Am. Fur Breed.*, Jan., 1954.

FOREIGN NEWS

Germany

German Scientists Honored.—The centennials of two outstanding German scientists, Paul Ehrlich and Emil von Behring, both of whom were recipients of the Nobel Prize, were celebrated in Frankfurt a. Main and Marburg a.d. Lahn from March 13 to March 16. Dr. Ehrlich is remembered for his work in developing salvarsan, and Dr. von Behring developed serums to be used against diphtheria and tetanus. The celebration was concluded with a convention of physicians and chemists from many countries, at which time Dr. Ernst Boris Chain was awarded the Paul Ehrlich Prize for 1954.

Great Britain

Hog Cholera Order Withdrawn.—An order imposed by the Ministry of Agriculture and Fisheries upon the hog cholera areas in April, 1953, was withdrawn in November. Restrictions on the balance of the affected area had been removed in July.—*Circ. Off. Internat. des Epizoot.* Jan., 1954.

STATE BOARD EXAMINATIONS

Florida.—The Florida State Board of Veterinary Examiners will hold an examination on June 14, 15, and 16, 1954, at the Everglades Hotel, Miami, Fla. Address inquiries to Dr. E. L. Matthews, secretary of the Board, Box 141, Palatka, Fla.

Idaho.—The Idaho State Veterinary Medicine Board will hold examinations on June 14, 15, 16, 1954, in the Senate chambers, State Capitol Building, Boise. Applicants are to report first to room 353 and bring their diplomas. Applications must be on file thirty days prior to the examination. No applicant will be permitted to write the examination unless his credentials are complete and in due form at the date of the examination; 1954 graduating seniors may attach to their applications a

letter from the dean of their college verifying status of last semester senior standing and bring evidence of graduation when appearing before the Board. Application forms will be furnished upon request to the Bureau of Occupational Licenses, room 353, State House, Boise. The fee for the examination is \$25; reciprocity, \$25; re-examination, \$10. Reciprocity applicants must appear personally before the Board. Britt Nedry, Director, Bureau of Occupational Licenses.

Oklahoma.—The Oklahoma State Board of Veterinary Medical Examiners will meet June 1-2, 1954, in Stillwater, Okla., for the purpose of holding examinations and considering applications for reciprocity. All communications regarding examinations or reciprocity should be addressed to Dr. J. B. Corcoran, secretary-treasurer, Oklahoma State Board of Veterinary Examiners, 127 N. W. 23 St., Oklahoma City, Okla.

VETERINARY MILITARY SERVICE

Lieutenant Colonel Robertson Honored.—Lieutenant Colonel Harry J. Robertson, V.C., has been awarded the Third Army's certificate of Achievement for his work as post veterinarian at Fort McPherson, Ga. Colonel Robertson is now stationed at Fort Wadsworth, N. Y.

* * *



—U.S. Army Photo

Lieutenant Colonel Omar Draz (center), deputy chief of the Egyptian army veterinary corps, at the Armed Forces Institute of Pathology with Brig. Gen. Jacob L. Hartman, chief of the U. S. Army Veterinary Corps (left), and Brig. Gen. Elbert de Coursey, director of the Institute. During a four month tour of the United States, Colonel Draz also conferred with officials of the Veterinary Division, office of the Army Surgeon General, and the Veterinary Division of the Army Medical Service Graduate School at Walter Reed Army Medical Center. Colonel Draz has a Master's Degree in veterinary medicine from the veterinary college of Cairo.

MARRIAGES

Captain Norbert R. McManus (UP '47) of Catskill, N. Y., and First Lieutenant Mary M. Hollen, Jeannette, Pa., were married in Berlin, Germany, on Aug. 12, 1953.

G. H. Hart (UP '03), dean, School of Veterinary Medicine, University of California, Davis, and Mrs. Theresa Ann Dennis, Jamestown, N. Y., were married on Jan. 6, 1954.

BIRTHS

First Lieutenant (WSC '52) and Mrs. Howard F. Lancaster, Fort Huachuca, Ariz., announce the birth of a son, Brad Allan, on Nov. 26, 1953.

Dr. (TEX '53) and Mrs. Henry C. Melius, New Orleans, La., announce the birth of a daughter, Donna Lucille, on Dec. 14, 1953.

Dr. (API '53) and Mrs. B. Irving Grissett, Gadsden, Ala., announce the birth of a son, John Roger, on Jan. 31, 1954.

DEATHS

★**Jacob E. Behney** (UP '14), 68, Valley Forge, Pa., died in December, 1953. Dr. Behney had attained the rank of colonel in the Veterinary Corps of the U. S. Army. He was admitted to the AVMA in 1918.

William P. Cummings (KCV '15), 60, Des Moines, Iowa, died Sept. 7, 1953. Dr. Cummings served in the Veterinary Corps of the U. S. Army during the first World War. He later practiced at Perry, Iowa, and then became dairy inspector for the City of Perry, serving in that capacity until his death. Dr. Cummings is survived by his widow, a son, and a granddaughter.

★**Howard L. Darby** (USC '04), 70, Fort Worth, Texas, died during the latter part of December, 1953. Dr. Darby was inspector in charge for the U. S. Bureau of Animal Industry in Fort Worth and was widely known for his work on the eradication of the Texas cattle tick, and tuberculosis and brucellosis control in cattle in Texas. He was a member of the Methodist Church, the National Association of Federal Veterinarians, the Veterinary Medical Association of Texas, and of the AVMA. Dr. Darby is survived by his widow, two daughters, and two grandchildren.

Eric O. Ericson (KCV '16), Duluth, Minn., died Oct. 1, 1953. Dr. Ericson was chief food and sanitary inspector for the Duluth Health Department.

★**Thomas J. Foster** (OSU '09), 68, Monticello, Ill., died Jan. 8, 1954. Dr. Foster, a general practitioner, was a member of the Illinois Veterinary Medical Association and of the AVMA. He is survived by his widow.

★**Charles J. Frey** (USC '06), 83, Silver Spring, Md., died Feb. 1, 1954. Dr. Frey, a small animal practitioner, was a member of the Maryland Veterinary Medical Association and of the AVMA. He is survived by his widow, a son, and a daughter.

Thurber H. Heath (ONT '23), Haverhill, Mass., died in 1952. Dr. Heath was a general practitioner.

★**Henry W. Jeffers**, Plainsboro, N. J., died in July, 1953. Mr. Jeffers was made an honorary member of the AVMA in 1935.

★**E. D. Kennedy** (KCV '06), 73, Monrovia, Calif., died Nov. 5, 1953. Dr. Kennedy had served in the U. S. Bureau of Animal Industry for more than thirty-six years. On his retirement in 1942, as inspector in charge in Baltimore, Md., he returned to California. He is survived by his widow, Julia Kennedy. Dr. Kennedy was a member of the National Association of Federal Veterinarians, the California Veterinary Medical Association, and of the AVMA.

★**Louis H. LaFond** (MSC '23), 62, Detroit, Mich., died Feb. 15, 1954. An obituary appears on page 335 of this JOURNAL.

★**Edwin O. Lucking** (OVC '11), 78, DeSoto, Mo., died Jan. 16, 1954. Dr. Lucking was a member of the Missouri Veterinary Medical Association and of the AVMA. He is survived by his widow.

★**Bernard C. Meyers** (CIN '20), 55, Norwalk, Ohio, died Feb. 3, 1954. Dr. Meyers, a general practitioner, was a member of the Ohio Veterinary Medical Association and of the AVMA. He is survived by his widow.

Bert E. Miller (GR '12), 78, Ann Arbor, Mich., died Nov. 20, 1953. Dr. Miller was a small animal practitioner.

★**Leonard O. Price** (IND '15), 63, Blacksburg, Va., died Jan. 31, 1954. Dr. Price was a general practitioner. He was a member of the Virginia State Veterinary Medical Association and of the AVMA.

William J. Rooks (OVC '94), 88, Holland, Mich., died Aug. 29, 1953. Dr. Rooks had practiced in the Holland area for many years. He is survived by two daughters, two sons, nine grandchildren and ten great-grandchildren. Dr. Rooks was a member of the Michigan Veterinary Medical Association.

★**Edward J. Watters** (CVC '07), 88, Houghton, Mich., died Dec. 4, 1953. Dr. Watters, who had retired, had recently been granted life membership in the AVMA. He joined the Association in 1917. He is survived by a daughter.

Orrin B. Webber (COR '12), 63, Rochester, N. Y., died Nov. 8, 1953. Dr. Webber was a small animal practitioner.

Floyd Wilson (COR '14), 61, Dallas, Texas, died Jan. 21, 1954. Dr. Wilson was employed by the U. S. Bureau of Animal Industry.

★Indicates members of the AVMA.

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COMING MEETINGS

Notices of Coming Meetings must be received by 4th of month preceding date of issue

- Alabama Veterinary Medical Association. Annual meeting. Admiral Semmes Hotel, Mobile, Ala., April 4-6, 1954. M. K. Heath, Auburn, Ala., secretary.
- Animal Disease Research Workers in the Southern States. Annual meeting. Alabama Polytechnic Institute, Auburn, Ala., April 8-9, 1954. Paul L. Piercy, School of Veterinary Medicine, University of Georgia, Athens, Ga., secretary.
- Washington, State College of. Annual conference for veterinarians. College of Veterinary Medicine, State College of Washington, Pullman, Wash., April 8-10, 1954. John R. Gorham, Department of Veterinary Pathology.
- Texas Conference on Diseases in Nature Transmissible to Man. Annual conference. A. & M. College of Texas, College Station, Texas, April 12-13, 1954. John P. Delaplane, A. & M. College of Texas, College Station, Texas.
- Pennsylvania, University of. Annual post-graduate short course for veterinarians. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa., April 12-15, 1954. M. W. Allam, dean.
- Ohio State University, College of Veterinary Medicine. Conference for veterinarians. April 14-15, 1954. John H. Helwig, chairman.
- North Central Iowa Veterinary Medical Association. Annual meeting. Warden Hotel, Fort Dodge, Iowa, April 15, 1954, from 10:00 a.m. to 5:00 p.m. B. J. Gray, Box 797, Fort Dodge, Iowa, secretary.
- Oklahoma Conference for Veterinarians. School of Veterinary Medicine, Stillwater, Okla., May 3-4, 1954. W. M. Rice, Department of Medicine and Surgery, chairman.
- American Animal Hospital Association. Annual meeting. Hotel Statler, New York, N. Y., May 5-8, 1954. Wayne H. Riser, 5335 Touhy Ave., Skokie, Ill., secretary.
- Eastern Iowa Veterinary Association, Inc. All-day practitioners' clinic. Hawkeye Downs, Cedar Rapids, Iowa, May 11, 1954. Wayne H. Thompson, Earlville, Iowa, secretary.
- Texas Conference for Veterinarians. Annual conference. School of Veterinary Medicine, A. & M. College of Texas, College Station, Texas, June 3-4, 1954. R. D. Turk, chairman.
- Wyoming Veterinary Medical Association. Annual meeting. Cody, Wyo., June 13-14, 1954. John F. Ryff, P.O. Box 960, Laramie, Wyo., secretary.
- Montana Veterinary Medical Association. Annual meeting, Miles City, Mont., June 17-19,
1954. E. A. Tunnicliff, Agricultural Experiment Station, Bozeman, Mont., secretary.
- Michigan State Veterinary Medical Association. Annual meeting. Beach Hotel, Charlevoix, Mich., June 18-19, 1954. Paul V. Howard, 4011 Hunsberger, N.E., Grand Rapids 5, Mich., secretary.
- Idaho Veterinary Medical Association. Annual meeting. Twin Falls, Idaho, June 21-22, 1954. A. P. Schneider, 2025 N. 23rd St., Boise, Idaho, secretary.
- California State Veterinary Medical Association. Annual convention. U. S. Grant Hotel, San Diego, Calif., June 21-23, 1954. Charles S. Travers, 3004 16th St., San Francisco, Calif., executive secretary.
- North Carolina State Veterinary Medical Association. Annual meeting. Robert E. Lee Hotel, Winston-Salem, N. Car., June 22-23, 1954. Clyde W. Young, Mocksville, N. Car., secretary.
- Maritime Veterinary Associations Joint Conference. Annual meeting. Mount Allison University, Sackville, N. B., June 22-24, 1954. Dr. J. F. Frank, Sackville, N. B., secretary, joint committee.
- Pennsylvania, University of. Conference for veterinary radiologists. School of Veterinary Medicine, University of Pennsylvania, Philadelphia, Pa., June 24-25, 1954. Teaching radiologists and practitioners invited. F. G. Fielder, 39th and Woodland Ave., Philadelphia 4, Pa., registrar.
- Utah Veterinary Medical Association. Annual meeting. Ogden, Utah, June 24-25, 1954. Joe B. Thurman, 1407 S. State St., Orem, Utah, secretary.
- Maryland State Veterinary Medical Association. Annual summer meeting. George Washington Hotel, Ocean City, Md., July 1-2, 1954. John D. Gadd, Cockeysville, Md., secretary.
- American Veterinary Medical Association. An-

(Continued on p. 32)

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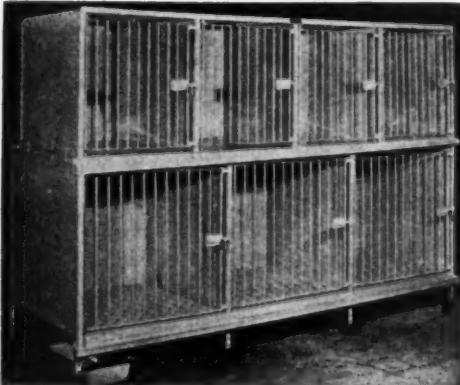
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- nual meeting. The Olympic Hotel, Seattle, Wash., Aug. 23-26, 1954. J. G. Hardenbergh, 600 S. Michigan Ave., Chicago 5, Ill., executive secretary.
- Virginia Veterinary Medical Association.** Annual meeting. Charlottesville, Va., Aug. 29-31, 1954. A. J. Sipos, 1102 State Office Building, Richmond, Va., secretary.
- New Mexico Veterinary Medical Association.** Annual meeting. LaFonda Hotel, Santa Fe, N. M., Sept. 13-14, 1954. Joseph M. Miller, Box 149, Alamogordo, N. M., secretary.
- New York State Veterinary Medical Society.** Annual meeting. Saranac Inn, Saranac, N. Y., Sept. 15-17, 1954. Joan S. Halat, Utica, N. Y., acting executive secretary.
- Conference for Veterinarians.** Alabama Polytechnic Institute, Auburn, Ala., Sept. 16-18, 1954. R. S. Sugg, dean, School of Veterinary Medicine, Alabama Polytechnic Institute, Auburn, Ala.
- Pennsylvania State Veterinary Medical Association.** Annual meeting. Pocono Manor Inn, Pocono Manor, Pa., Oct. 13-15, 1954. R. C. Snyder, Walnut St. and Copley Rd., Upper Darby, Pa., secretary.
- Eastern Iowa Veterinary Association, Inc.** Annual meeting. Hotel Montrose, Cedar Rapids, Iowa, Oct. 14-15, 1954. Wayne H. Thompson, Earlville, Iowa, secretary.
- Department of Health, Education, and Welfare,** in coöperation with the journal, *Antibiotics and Chemotherapy*. Symposium on Antibiotics. Washington, D. C., Oct. 20-22, 1954. Henry Welch, chairman.
- U. S. Livestock Sanitary Association.** Annual meeting. Hotel Fontenelle, Omaha, Neb., Nov. 10-12, 1954. R. A. Hendershott, 1 West State Street, Trenton 8, N. J., secretary.
- Tennessee Veterinary Medical Association.** Annual meeting. Knoxville, Tenn., Jan. 9-11, 1955. H. W. Hayes, 734 Broadway, North East, Knoxville, Tenn., secretary.

Foreign Meetings

- Second Pan American Congress of Veterinary Medicine.** Sao Paulo, Brazil, April 3-10, 1954. Dr. Joao Soares Veiga, chairman; Dr. Virginia Buff D'Apice, secretary general, P.O. Box 7064, Sao Paulo, Brazil.
- British Caribbean Veterinary Association.** Port-of-Spain, Trinidad, B.W.I., May 24-27, 1954. Dr. Stephen B. Bennett, c/o Department of Agriculture, St. Clair, Port-of-Spain, Trinidad, chairman, Organizing Committee.

(COMING MEETINGS—continued on p. 34)

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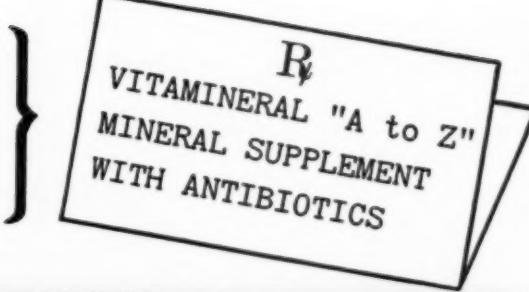
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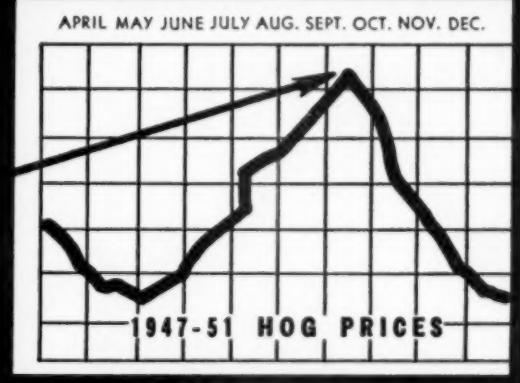


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(COMING MEETINGS—continued from p. 32)

Regularly Scheduled Meetings

Atlanta Veterinary Society, the second Tuesday of every month. C. L. Bromley, Jr., 1634 Northside Drive, Atlanta, Ga., secretary.

Baltimore City Veterinary Medical Association, the second Thursday of each month, September through May (except December), at 9:00 p.m. at the Park Plaza Hotel, Charles and Madison Streets, Baltimore, Md. Victor I. Sorgen, 133 Wiltshire Rd., Baltimore 21, Md., secretary.

Bay Counties Veterinary Medical Association the second Tuesday of each month. D. E. Madsen, 44 S. 4th St., San Jose, Calif., secretary.

Cedar Valley Veterinary Association, the second Monday of each month (except July and August) at Black's Tea Room, Waterloo. F. E. Brutsman, Traer, Iowa, secretary.

Central California Veterinary Medical Association, the fourth Tuesday of each month. W. E. Smith, 516 Oatman, Sanger, Calif., secretary.

Central Carolina Veterinary Medical Association, the second Wednesday of each month at 7:00 p.m. in the O'Henry Hotel in Greensboro. Mr. Earl D. Adams, Greensboro, N. Car., secretary.

Chicago Veterinary Medical Association, the second Tuesday of each month. Robert C. Glover, 1021 Davis St., Evanston, Ill., secretary.

Coastal Bend Veterinary Association (Texas), the second Wednesday of each month. J. E. Hoban, 4301 S. Port Ave., Corpus Christi, Texas, secretary.

Coon Valley Veterinary Association, the second Wednesday of each month, September through May, at the Bradford Hotel, Storm Lake, Iowa. J. R. Rosdail, Pomeroy, Iowa, secretary.

Cuyahoga County (Cleveland, Ohio) Veterinary Medical Association, the first Wednesday of each month—September through May (except January)—at 9:00 p.m. at the Carter Hotel, Cleveland, Ohio. Roger W. Grundish, 4217 Mayfield Road, South Euclid 21, Ohio, secretary.

East Bay Veterinary Medical Association, bimonthly, the fourth Wednesday. Robert Clemens, 23352 Orchard, Hayward, Calif., secretary.

Eastern North Carolina Veterinary Medical Association, the first Friday of each month, time and place specified monthly. C. B. Randall, Kinston, N. Car., secretary.

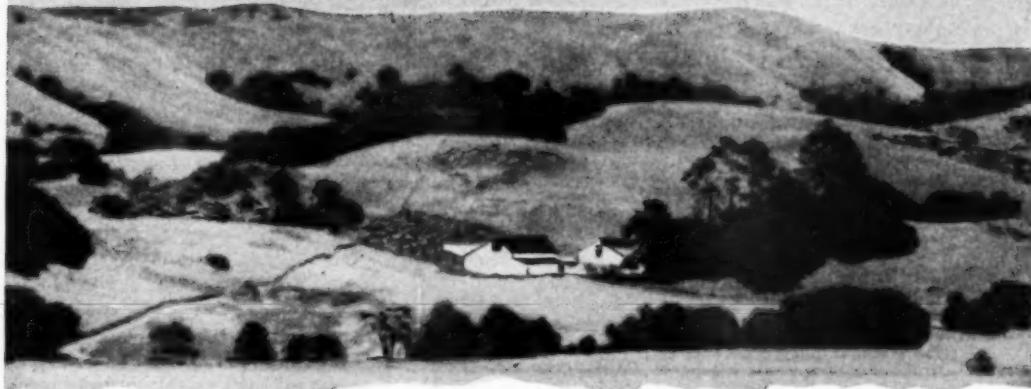
Fayette County Veterinary Association, Iowa, the third Tuesday of each month, except in July and August, at Pa and Ma's Restaurant.

(Continued on p. 36)

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(COMING MEETINGS—continued from p. 34)

West Union, Iowa. Donald E. Moore, Box 178, Decorah, Iowa, secretary.

Florida, North-East Florida Veterinary Medical Association, the second Thursday of each month, time and place specified monthly. J. O. Whiddon, 829 San Marco Blvd., Jacksonville, Fla.

Greater St. Louis Veterinary Medical Association, the first Friday of the month at the York Hotel, Sixth and Market Streets. Luther E. Fredrickson, Room 11, Municipal Courts Bldg., St. Louis, Mo., secretary.

Houston Veterinary Medical Association, Houston, Texas, the first Thursday of each month. Edward Lepon, Houston, Texas, secretary-treasurer.

Illinois Valley Veterinary Medical Association, the second Sunday evening of even-numbered months at the Jefferson Hotel, Peoria, Ill. S. M. McCully, Lacon, Ill., secretary.

Indiana Tenth District Veterinary Medical Association, third Thursday of each month. L. A. Snider, New Palestine, Ind., secretary.

Jefferson County Veterinary Society of Kentucky, Inc., the first Wednesday evening of each month, in Louisville or within a radius of 50 miles. Dr. W. E. Bewley, P.O. Box "H", Crestwood, Ky., secretary.

Kansas City Small Animal Hospital Association, the first Monday of each month, at the Hotel Continental. J. A. Zacher, 3632 Main St., Kansas City, Mo., secretary.

Kansas City Veterinary Medical Association, the third Tuesday of each month, in the Hotel Continental, 11th and Baltimore, Kansas City, Mo. J. C. Davis, 7332 Canterbury St., Kansas City 13, Mo., secretary.

Kern County Veterinary Medical Association, the first Thursday of each month. R. A. Stiern, 17 Niles St., Bakersfield, Calif., secretary.

Keystone Veterinary Medical Association, the Philadelphia County Medical Society Building, 301 S. 21st Street, Philadelphia, Pa., on the fourth Wednesday of each month. Raymond C. Snyder, 39th and Woodland Ave., Philadelphia 4, Pa., secretary.

Kyowa Veterinary Medical Association, the second Thursday of each month in the Hotel Prichard, Huntington, W. Va., at 8:30 p.m. Karl Mayer, 1531 Fourth Ave., Huntington, W. Va., secretary.

Maricopa County Veterinary Association, the second Tuesday of each month. Charles J. Prchal, 1722 East Almeria Road, Phoenix, Ariz., secretary.

Metropolitan New Jersey Veterinary Medical Association, the third Wednesday evening of each month from September through May, at

(Continued on p. 38)



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the Academy of Medicine of Northern New Jersey, 91 Lincoln Park South, Newark, N. J. Myron S. Arlein, 2172 Millburn Ave., Maplewood, N. J., secretary.

Michiana Veterinary Medical Association, the second Thursday of each month, at Hotel LaSalle, South Bend, Ind. Bruce Hostrawser, 2621 Mishawaka Ave., South Bend, Ind., secretary.

Michigan, Southeastern Veterinary Medical Association, the second Thursday of every month, September through May. Gilbert Meyer, 14003 E. Seven Mile Road, Detroit 5, Mich., secretary.

Mid-Coast Veterinary Medical Association, the first Thursday of every even month. George McCollister, 2146 Broad St., San Luis Obispo, Calif., secretary.

Milwaukee Veterinary Medical Association, the third Tuesday of each month, at the Half-Way House, Blue Mound Rd. George F. Lynch, 201 West Devon St., Milwaukee 17, Wis., secretary.

Mobile-Baldwin Veterinary Medical Association, the first Tuesday of each month at the Hotel Admiral Simmes, Mobile, Ala. C. Eric Kennedy, Mobile, Ala., secretary.

Monterey Bay Area Veterinary Medical Association, the third Wednesday of each month. Lewis J. Campbell, 66 Marion Ave., Salinas, Calif., secretary.

New Castle County Veterinary Society, the second Wednesday of each month at 9:00 p.m. in the Hotel Rodney, Wilmington, Del. Harold Roberts, Paper Mill Road, Newark R3, Del., secretary.

New York City, Veterinary Medical Association of, the first Wednesday of each month at the New York Academy of Sciences, 2 East 63 St., New York City. C. R. Schroeder, Lederle Laboratories, Inc., Pearl River, N. Y., secretary.

Northern Colorado Veterinary Medical Association, the second Monday of each month. William D. Carlson, P.O. Box 478, Fort Collins, Colo., secretary.

Northern New Jersey Veterinary Association, the fourth Tuesday evening from September through June, at the Casa Mana Restaurant, Cedar Lane, Teaneck, N. J. Robert R. Shomer, 1680 Teaneck Road, N. J., secretary.

Northern San Joaquin Valley Veterinary Medical Association, the fourth Wednesday of each month. Tom Hagan, Gen. Del., Escalon, Calif., secretary.

Oklahoma County Veterinary Medical Association, the second Wednesday of every month except August and July. R. J. Keller, 1701 N. Highland Drive, Oklahoma City, Okla., secretary.

(Continued on p. 40)

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(COMING MEETINGS—continued from p. 38)

Orange Belt Veterinary Medical Association, the second Monday of each month at 7:00 p.m. in the Antlers Hotel, San Bernardino, Calif. William J. Kelber, 1111 West A St., Ontario, Calif., secretary.

Orange County Veterinary Medical Association, bi-monthly. Donald E. Lind, 2643 N. Main, Santa Ana, Calif., secretary.

Peninsula Veterinary Medical Association, the third Monday of each month. P. H. Hand, Box 1035, Millbrae, Calif., secretary.

Piedmont Veterinary Medical Association, the last Friday of each month at 7:00 p.m. in Mull's Motel in Hickory, N. Car. G. V. McCranie, Hickory, N. Car., secretary.

Pima County (Arizona) Veterinary Medical Association, the third Wednesday of each month, in Tucson. R. W. Adami, 2103 S. 6th Ave., Tucson, Ariz., resident secretary.

Portland (Oregon) Veterinary Medical Association, the second Tuesday of each month, in the Auditorium of the Upjohn Company. Victor T. Oliver, 9705 S.W. Barbur Blvd., Portland 19, Ore., secretary.

Redwood Empire Veterinary Medical Association, the third Thursday of each month. H. M. Strandberg, 203 D St., Petaluma, Calif., secretary.

Sacramento Valley Veterinary Medical Association, the second Wednesday of each month. S. M. Foster, 430 College, Woodland, Calif., secretary.

Saginaw Valley Veterinary Medical Association, the last Wednesday of each month. F. Ferguson, 1702 S. Dort Highway, Flint, Mich., secretary.

San Diego County Veterinary Medical Association, the fourth Tuesday of each month. Warren J. Dedrick, 904 S. Lemon, El Cajon, Calif., secretary.

Santa Barbara-Ventura Counties Veterinary Medical Association, Friday evenings every sixth week. Dee Wodars McDermott, 5879 Hollister, Coleta, Calif., secretary.

Seattle Veterinary Medical Association, the third Monday of each month in the home of Dr. Fred Cummings, 5828-5th, N.W., Seattle, Wash.

Southern California Veterinary Medical Association, the third Wednesday of each month. R. W. Sprowl, 11756 San Vicente Blvd., Los Angeles 49, Calif., secretary.

South Florida Veterinary Society, the third Tuesday of each month, at the Seven Seas Restaurant, Miami, Fla. E. A. Majilton, 1093 N. E. 79th St., Miami, Fla., secretary.

Tulsa Veterinary Medical Association, the third Thursday of each month, in Director's Parlor of the Brookside State Bank, Tulsa, Okla. John Carnes, Muskogee, Okla., secretary.

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Veterinarian wanted to manage small animal practice, Chicago area. Salary can be percentage or monthly basis if desired. Minimum salary, \$6,000. Address "Box X 6," c/o JOURNAL of the AVMA.

Recently graduated veterinarian from recognized college wanted to assist in Chicago small animal hospital. Illinois license required. Excellent starting salary and rapid increase commensurate with ability. Address "Box V 6," c/o JOURNAL of the AVMA.

Graduate veterinarian wanted for public health meat control; experience in meat inspection preferred but not essential. Annual starting salary \$4,193 with yearly increments giving maximum \$4,551. Two weeks' vacation, sick leave, and liberal disability and retirement benefits. Give age, experience, references, and other particulars when answering. Permanent position, Jefferson County Board of Health, Birmingham, Ala.

Veterinarian wanted for poultry disease diagnostic work in Eastern state laboratory. Address "Box X 14," c/o JOURNAL of the AVMA.

(Continued on p. 44)

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Niacinamide.....	100 mg.
Riboflavin.....	2 mg.
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Calcium Pantothenate.....	10 mg.
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(CLASSIFIED ADS—continued from p. 42)

Opportunity for veterinarian to assist in modern small animal hospital in New York City; lead to equal partnership in short time, then to complete ownership. Address "Box X 20," c/o JOURNAL of the AVMA.

Veterinarian wanted to assist in general practice, mostly small animals. Ohio license required. In reply state age, experience, marital status, starting salary desired. Address "Box X 26," c/o JOURNAL of the AVMA.

Veterinarian wanted as assistant in small animal hospital. Salary and apartment; Maryland license required. Please state training and other details. Address "Box X 25," c/o JOURNAL of the AVMA.

Wanted—Positions

Ambitious veterinarian interested in position with general practitioner. Ohio license, age 33, single; would like to live in country in nice environment. Four years of small animal experience. Address "Box X 1," c/o JOURNAL of the AVMA.

Licensed veterinarian, Pennsylvania and Maryland, desires to obtain permanent position with small animal hospital or desires to buy a small animal practice in Pennsylvania or Maryland. Graduate of approved school with one year of practical experience. Address "Box X 2," c/o JOURNAL of the AVMA.

(Continued on p. 46)

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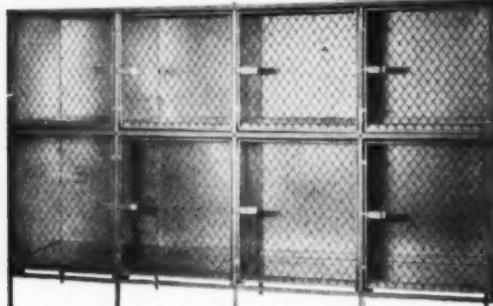
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manufacturers

EAST RIVER WIRE WORKS
39-40 Twenty-first St., Long Is., City 1, N.Y.

(CLASSIFIED ADS—continued from p. 44)

Experienced, graduate veterinarian available for relief work while you are on vacation. Licensed. Address "Box X 4," c/o JOURNAL of the AVMA.

June graduate, AVMA-approved school, desires position with small animal practitioner in Texas with future possibilities. Married; draft exempt. Address "Box X 5," c/o JOURNAL of the AVMA.

Veterinarian with experience in mixed practice and artificial insemination, presently on faculty of veterinary college, desires position in large animal practice in Eastern United States. Own car, equipment; 31 years old, hard working. Write working conditions, salary, et cetera. Available in June. Address "Box X 7," c/o JOURNAL of the AVMA.

Veterinarian desires position with progressive general practitioner in Southeast leading to partnership. Graduate of AVMA-approved school, six years' experience in general practice. Have some capital, age 29, married. Address "Box V 30," c/o JOURNAL of the AVMA.

For personal reasons desire to leave present successful one-man practice for partnership or permanent nonpractice position permitting at least minimum free time, in or near New York State. Request personal interview if feasible. Address "Box X 9," c/o JOURNAL of the AVMA.

June graduate wants position with small animal practitioner in California or other Western state. Considerable experience. AVMA-approved school. Age 27; draft exempt. Address "Box X 10," c/o JOURNAL of the AVMA.

Senior graduating in June desires position in small animal hospital; prefer East Central states, will consider anywhere. Previous experience, hard worker; single, draft exempt. Address "Box X 11," c/o JOURNAL of the AVMA.

June, 1954, Pennsylvania graduate, 29 years old, married, veteran, car, desires position in mixed or small animal practice in Southwest or California. Address "Box X 15," c/o JOURNAL of the AVMA.

Position wanted in mainly small animal practice, preferably one with opportunity to buy into later. Have one year of small animal experience; Florida license. Address "Box X 22," c/o JOURNAL of the AVMA.

(Continued on p. 48)

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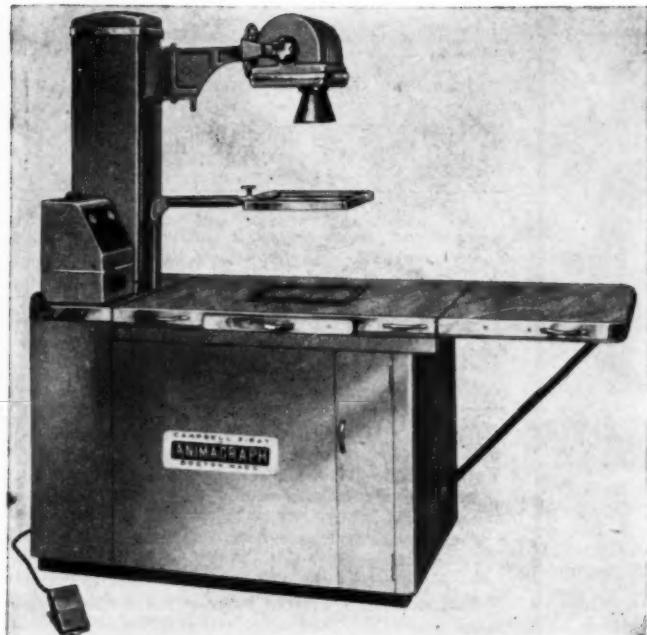
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Graduate of AVMA-approved school, 1951, desires temporary or permanent employment in small or large animal practice in California. Licensed in California; experienced. Address "Box X 23," c/o JOURNAL of the AVMA.

May, 1954, graduate, AVMA-approved school, seeks opportunity to work in small animal practice. Some experience. Single, veteran. Address "Box X 24," c/o JOURNAL of the AVMA.

Sales career desired with ethical company. Experience covers large and small animals and regulatory work. Address "Box X 27," c/o JOURNAL of the AVMA.

Cornell graduate, 1935, seeks responsible association with small animal hospital, Metropolitan New York or New Jersey. Also consider temporary work; lease, buy. Address "Box X 28," c/o JOURNAL of the AVMA.

Wanted—Practices

Financially responsible veterinarian wants to buy small animal hospital or mixed practice in Virginia. Address "Box X 18," c/o JOURNAL of the AVMA.

Want to buy small animal hospital in Chicago or suburbs. Have cash to handle any reasonable deal. Address "Box X 19," c/o JOURNAL of the AVMA.

(Continued on p. 49)

For TEAT PROBLEMS IN YOUR PRACTICE

SULFA impregnated—

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To maintain unrestricted milk flow and provide antiseptic protection are of first importance in the care of injured teats, scab teats, and in post operative therapy.

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Desire to lease, beginning June 1, with option to purchase after one year, mixed practice, including small animal hospital. Am licensed and prefer practice located in Indiana; practice must be active and real estate financially sound. Prefer location in city over 35,000 in population. Graduate of accredited school, 1944; veteran exempt; 36 years of age; married. Currently engaged as salaried associate in small animal practice. All replies will be confidentially respected and answered. Address "Box X 13," c/o JOURNAL of the AVMA.

For Sale or Lease—Practices

Large animal dairy practice for sale in Northern Illinois. Easily grossing over \$25,000. Modern home, office, and garage. Price, \$20,000; suitable terms can be arranged. Address "Box X 8," c/o JOURNAL of the AVMA.

Small animal hospital for sale; profitable, established practice. Landscaped, fine house, commuting distance from New York City, on main highway in Fairfield County, Connecticut. Please state experience in practice and amount of capital available for purchase on terms. Address "Box V 3," c/o JOURNAL of the AVMA.

Small animal hospital near Los Angeles, for sale. No real estate; 40-animal capacity. Gross \$26,000; \$12,500 cash or \$13,500 terms with \$5,000 minimum down. Address "Box W 17," c/o JOURNAL of the AVMA.

(Continued on p. 52)



Provides an accurate pattern against which to cut with knife or razor blade. Fits firmly, cannot move or slip when clamped into position. Made of non-rusting, light, cast aluminum, highly polished. Lasts a lifetime with minimum care. Simplicity of design and construction reduces possibility of breakage or mechanical failure. Forms immediately available to provide distinctive marking of these breeds:

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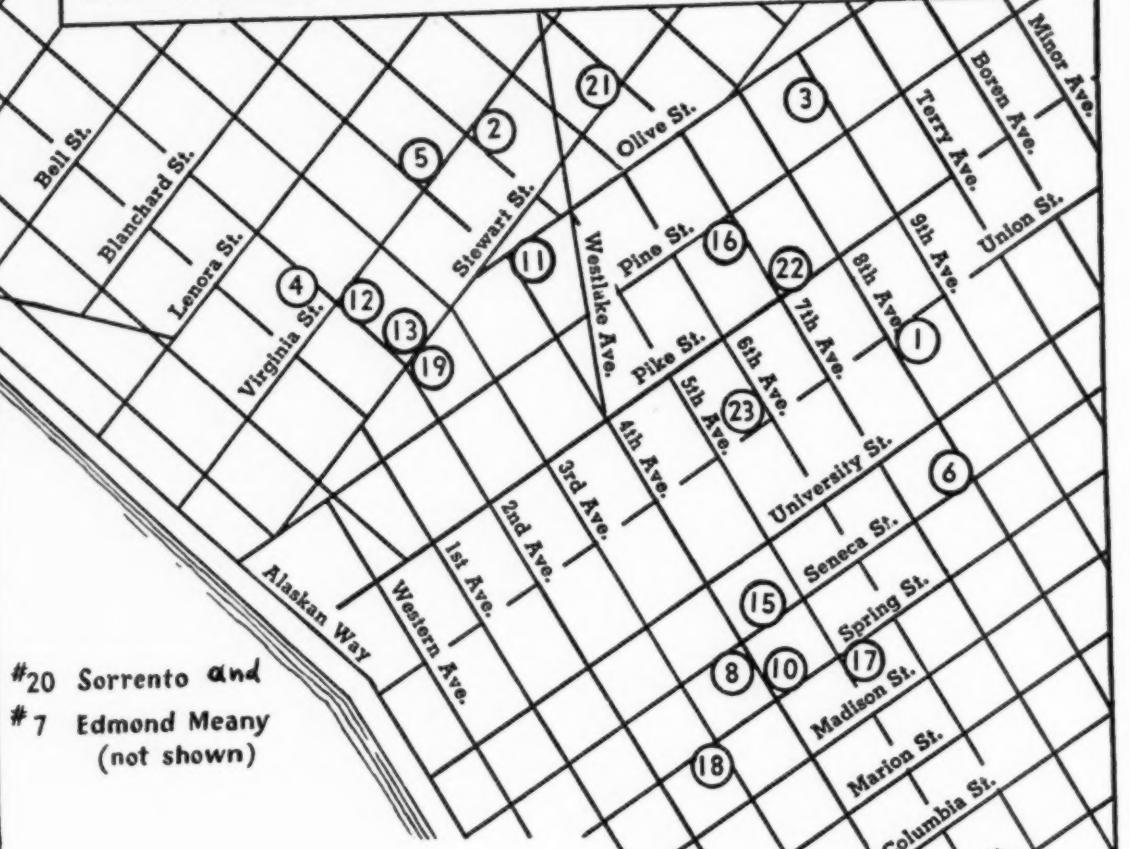
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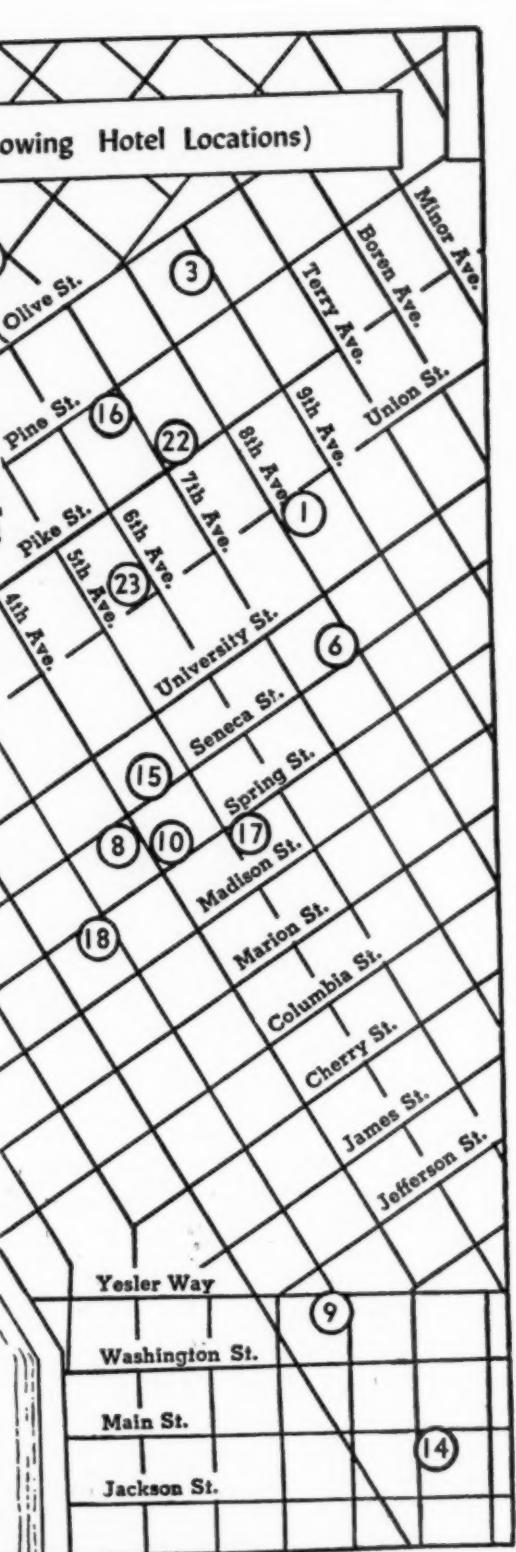
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MAP OF SEATTLE, WASHINGTON (Showing Hotel Locations)



Key to Names of Hotels on Map

No.	Hotel	No.	Hotel
(1)	Ambassador	(13)	New Washington
(2)	Benjamin Franklin	(14)	New Richmond
(3)	Camlin	(15)	Olympic
(4)	Commodore	(16)	Roosevelt
(5)	Claremont	(17)	Spring Apt.
(6)	Exeter	(18)	Strafford
(7)	not shown	(19)	Stewart
(8)	Earl	(20)	not shown
(9)	Frye	(21)	Vance
(10)	Hungerford	(22)	Waldorf
(11)	Mayflower	(23)	Windsor
(12)	Moore		



HOTEL RESERVATIONS — SEATTLE CONVENTION

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All requests for hotel accommodations will be handled by a Housing Bureau in cooperation with the Committee on Local Arrangements. The Bureau will clear all requests and confirm reservations.

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2. Benjamin Franklin	\$7.00	\$10.00-11.00	\$11.00-15.00
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4. Commodore	\$4.50	\$6.00	
5. Claremont	\$4.50	\$5.50-10.00	
6. Exeter	\$5.50	\$7.50	\$9.00
7. Edmond Meany	\$6.00	\$8.00-9.50	
8. Earl	\$4.50	\$6.00	\$7.00
9. Frye	\$4.00	\$6.00	\$7.50
10. Hungerford	\$5.00-6.00	\$7.00-9.00	
11. Mayflower	\$7.00	\$10.00-11.00	\$12.00-14.00
12. Moore	\$5.00	\$7.00	\$8.00
13. New Washington	\$5.50-12.00	\$8.50-14.00	\$9.50-16.00
14. New Richmond	\$3.50-4.00	\$5.00-5.50	\$6.50
15. Olympic	\$6.00-15.00	\$8.00-15.00	\$9.50-15.00
16. Roosevelt	\$6.00	\$8.00	\$10.00
17. Spring Apt.	\$5.00	\$7.00	\$8.00-9.00
18. Stratford	\$5.00	\$7.00	
19. Stewart	\$5.50-7.50	\$6.50-8.50	\$9.50
20. Sorrento			\$6.00-8.00
21. Vance	\$5.75	\$5.50-6.75-7.50	\$7.50-8.00
22. Waldorf	\$2.50-3.50(*)	\$3.50-5.00(*)	\$7.50
	\$5.00	\$6.50	
23. Windsor	\$6.00	\$8.00	\$9.00

(*) without bath. Tear Here

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Date

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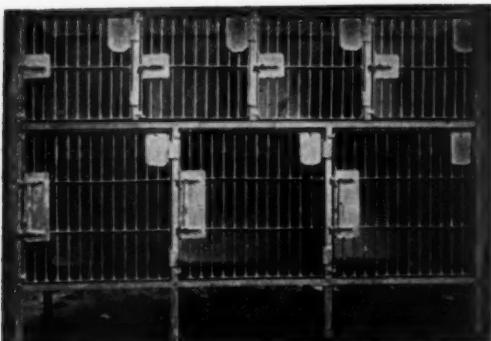
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Completely equipped mixed practice for sale in Iowa. Small animal kennels and runs; large modern four-room apartment overhead. Adjoining home available. Gross, over \$45,000; takes \$10,000 to handle. Address "Box X 16," c/o JOURNAL of the AVMA.

Combination home and hospital for sale in Northeastern seaboard city of 25,000; no competition; good practice, mostly small animal. Low overhead. Total price of \$22,500 includes home, hospital, and all equipment. Terms arranged. Address "Box X 17," c/o JOURNAL of the AVMA.

Excellent small animal practice for sale in southern California. No real estate. Full price of \$14,000 includes drugs and equipment; grossing over \$18,000. Address "Box V 16," c/o JOURNAL of the AVMA.

Established mixed practice for sale in good dairy section of western New York. Will sell for value of real estate plus inventory of equipment and drugs wanted. Excellent terms. Only reason for selling—health factor. Address "Box V 13," c/o JOURNAL of the AVMA.

(Continued on p. 54)

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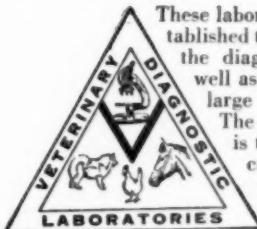
New Appointments at Motorola

Daniel E. Noble, vice-president of Motorola's Communications & Electronics Division, has announced the appointment of Lloyd P. Morris as chief engineer of a new Motorola service—the National Radio Systems Consulting Service.

Mr. Norris, with more than thirteen years' experience in two-way radio systems, is recognized as an authority in his field. His practical work on propagation is highly regarded throughout the nation and has contributed markedly to the successful design of many complicated systems.

Eugene S. Goebel, national sales manager of Motorola Communications & Electronics Inc., has announced the promotion of Harold A. Jones to executive assistant to the national sales manager. The new post adds responsibility in national sales management to Mr. Jones' present direction of the two-way radio Technical Information Center.

Laboratory Service for Veterinarians



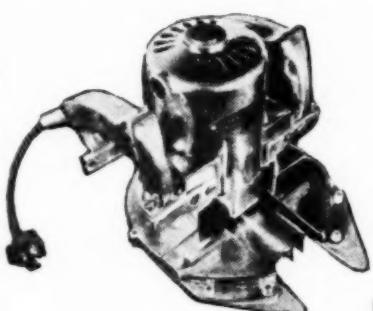
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P.O. Box 2157, Atlanta 1, Georgia

(CLASSIFIED ADS—continued from p. 52)

Due to ill health, must sell one of the largest practices in dairy cattle and small animals in the Northwest. This is an old established business in a rapidly growing community and requires the services of two veterinarians. May be bought including hospital, or will sell drugs, instruments, equipment and business separately, and lease building to buyer. Act quickly. Address "Box X 21," c/o JOURNAL OF THE AVMA.

Wanted to Buy

Wanted to buy a used 2, 4, or 6 ring centrifuge in good condition. Must be a bargain. Dr. J. R. Broussard, McComb, Miss.

Miscellaneous

FOR SALE—Animagraph x-ray machine with attachments in "new" condition; East River kennel, 8-cage unit in two tiers in excellent condition; 20 spread-wire cage tops and fronts with doors. Address Hamden Veterinary Hospital, 2612 Whitney Ave., Hamden, Conn.

Bovine Prolapse Preventer—Payton Utero-Vaginal Prolapse Preventer. Quickly, easily applied to any size cow. Aluminum, reusable nonirritating, sanitary. Noninterference with placenta release. Excellent for vaginal protrusion; dispensing. See article JOURNAL of the AVMA, December, 1951. Only \$3.00; two for \$5.00. Prepaid. Dr. Jerome Payton, Morris, N.Y.

For your office wall—charts at \$1 each (3 for \$2)—All American Breeds. World Dog Map. Keep

(Continued on p. 56)

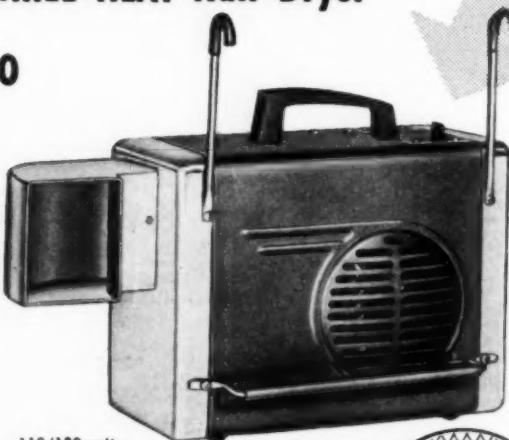
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THE NEW **EVSCO** THREE-HEAT Hair Dryer

LOW PRICED at \$**26⁵⁰**

DESIGN FOR DRYING

- Lightweight—8½ lbs; hangs on any standard dog cage.
- Temperature (12" from nozzle) "Lo" heat 103°F. "Hi" heat 134°F.
- Low heat, high heat, and cool air flows.
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- Touch-of-finger operating mechanism.
- Beautiful baked enamel finish with chrome trimming.



110/120 volts.
7 ft. U.L. approved cord.
50/60 cycle AC current only.

HERE IS THE OPPORTUNITY TO OWN MORE THAN ONE DRYER.

ETHICAL VETERINARY SUPPLY CO.

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Constant research gives your veterinarian new and better drugs



...to help protect your livestock's health

— —
*This Squibb advertisement
in full color is one of a
series appearing in the
Farm Quarterly stressing
the necessity of proper
diagnosis by veterinarians*



NEW SIGNS GOING UP
Many of the approximately 900 new veterinarians, who graduate this spring, will soon be putting up their signs . . . ready to serve you in bringing better health to your livestock.

Never before has your veterinarian had such highly effective drugs with which to fight disease in your herds.

But the search for newer and better treatments never ceases.

At veterinary colleges and experiment stations . . . and also at the Squibb laboratories in New Brunswick, N. J. . . extensive research is constantly carried on.

Highly-skilled Squibb scientists — using latest and most exacting techniques known to science—continually seek new and improved veterinary drugs, new applications of older ones.

Trained technicians, too, constantly seek

improved ways of producing Squibb veterinary products . . . to assure highest uniformity, purity, and efficacy.

Your veterinarian . . . through his professional associations, and veterinary journals . . . keeps abreast of latest approved techniques and drugs—including Squibb drugs.

He brings to your farm—on call—full benefits of modern scientific research to back up your management practices in guarding your livestock's health, and your investment.

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745 Fifth Avenue, New York 22, N. Y.

For prompt, accurate diagnosis, always consult your veterinarian.

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—A NAME YOU CAN TRUST

up on dogs through *Dog World* magazine, \$3, year; 5 years, \$10. Judy Publishing Co., 3323 Michigan Blvd., Chicago 16, Ill.

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Pregnancy Diagnosis—in mare from 45th to 150th day. Write for vials and mailing tubes. Price: \$7.00; 2 or more tests, \$6.00 each. Pregnancy Diagnostic Laboratories, H. S. Lames, D.V.M., Dysart, Iowa.

Clipper Blade Sharpening

Have your clipper blades sharpened by an expert with 28 years of practical factory training. We know how your blades must be ground to cut like new. Also clipper repairing. All work guaranteed to satisfy you or money back. Now serving veterinary colleges, and over 500 satisfied veterinarians. Why not you? 24-hour service. We ship insured prepaid. Avoid C.O.D. charges; enclose 75 cents for each set with blades. We are headquarters for Oster and Stewart clippers and blades. Complete clipping supplies; upper and lower replacements. Write for information on Oster and Stewart quality clippers and products. Service Grinding and Supply Co., 903 Chicago St., Racine, Wis.

Received Too Late to Classify

Opportunity wanted; prefer North or South Carolina or Virginia. Two years of mostly small animal experience; North Carolina license. Graduate, recognized school; married, veteran, age 27. Address "Box X 29," c/o JOURNAL of the AVMA.

Send for FREE 36-page Treatise on
CARROT OIL VITAMINS

Details the advantages of carrot oil vitamins when used in feeds to improve breeding results; to destroy oxidized milk flavors; and to promote general good health and glossy coats. Contains much information. Replete with data and references. Send for it today

NUTRITIONAL RESEARCH ASSOCIATES
Dept. 251-M. South Whitley, Indiana

Outstanding small animal hospital for sale in wealthy community, Southern California. Well-located, modern, fully equipped; buyer must be above average in ability and capable of pleasing high-grade clientele. Require \$20,000 down; reason for selling is other business interest. Address "Box X 30," c/o JOURNAL of the AVMA.

Veterinarian wanted for a three-man mixed practice in the Midwest. Good salary and commission for steady, reliable man. If experienced, give details. Address "Box V 27," c/o JOURNAL of the AVMA.

Relief veterinarian wanted for seven to ten days to work small animal practice in Connecticut. Lodging supplied. Please state qualifications, references, and salary. Address "Box X 31," c/o JOURNAL of the AVMA.

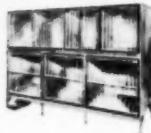
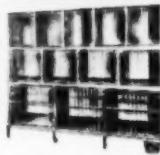
Canadian-licensed veterinarian wanted for small animal practice. No racial discrimination. Ability, honesty, and experience of paramount importance. Two years' probationary period at good salary leading to one-third partnership in two busy practices. Give full details in first letter or arrange personal interview with Dr. J. M. Stratas, 132 Danforth Ave., Toronto 6, Ont.

General practice and hospital, with apartment above, for sale in New England. Modern 8-room home adjacent. Exclusive residential area, two acres of land. Gross, \$14,000; price, \$42,000. Health reason for selling. Address "Box X 32," c/o JOURNAL of the AVMA.

Mixed practice for sale in Indiana; includes new home and office, drugs, and instruments. Gross, \$14,000. Total price, \$16,500; \$5,000 will handle. Address "Box X 33," c/o JOURNAL of the AVMA.

Veterinarian wanted for small animal practice in Chicago suburb. Must have, or be able to obtain Illinois license. State age, experience, marital status, desired salary in reply. Address "Box V 17," c/o JOURNAL of the AVMA.

"The Genuine" THE BEST BUY

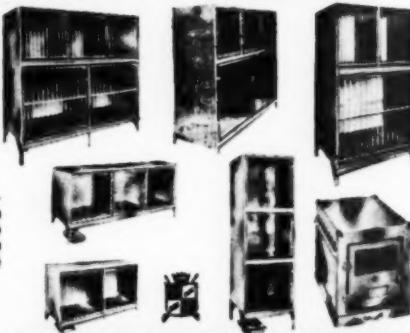


Style	Units	Size	Price	Style	Units	Size	Price
A	12	7½" x 28"	\$585.00	E	5	5' x 24"	\$179.50
B	8	7½" x 28"	\$395.00	F	3	3' x 28"	\$165.00
C	7	7½" x 28"	\$345.00	G	3	6' x 24"	\$143.00
D	5	5' x 28"	\$253.00	H	2	6' x 28"	\$140.00

All prices above show lower stalls depth only. Choice of bar, or 1½" diameter expanded mesh doors.

Also available in removable tray style, or plain flat floor style with or without gutter drains in front. Our units are available in 3, 5, 7, 8, or 12 cage units, or any combination you need, in 24" or 28" depth, with or without casters. Compare before you buy, and you will agree that our kennel is excellently constructed, more costlier materials used, and cheaper in price.

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DEE-CHICAGO MFG. CO.

Mfrs. of Dog Crates, Equip't & Supplies Since 1912
7600 S. Campbell Ave. REP. 2300 Chicago 29, Ill.

Remember —

MASTYN for udder infusion



Drs. Knappenberger and McConnell in New Norden Positions

Dr. Jack R. Knappenberger (KSC '39), formerly branch manager of Norden Laboratories, Columbus, Ohio, has joined the home offices at Lincoln as assistant sales manager. He has been succeeded by Dr. E. McConnell (GA '50) of the Kansas City branch.

Dr. Knappenberger was in general practice at Hutchinson, Kan., until World War II when he served four years in the U.S. Army. In 1948, he joined Norden Laboratories as sales representative in the Columbus territory. Dr. McConnell practiced in Tennessee until he joined Norden Laboratories in 1951.

The AVMA Will Pay 25 Cents Plus Postage for Each Copy of the Following:

• JOURNAL OF THE AVMA—

Jan., Feb., Dec., 1950; Jan., 1951; Feb.,
Aug., 1952; Mar., Dec., 1953

• AMERICAN JOURNAL OF VETERINARY RESEARCH—

Jan., April, 1950
April, July, 1951

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Desenex®

in SUPERFICIAL FUNGOUS INFECTIONS OF HIRSUTE SKIN IN SMALL ANIMALS

Exceptionally effective not only as a powerful antifungal agent—but as a quick acting, long lasting antipruritic agent.

Trial quantities sent on request.

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Available as
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Tubes of 1 oz.
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Sifter packages
of 1 ½ oz.
Containers of 1 lb.
SOLUTION
UNDECYLENIC ACID
Bottles of 2 oz.
and 1 pt.

PD-42

Thirteen different insulins have been tested and classified into four categories, according to the duration of their action.—*Brit. M. J.*, Nov. 7, 1953.

Associated Serum Producers' Publicity Program

A series of television programs portraying the importance and value of the veterinary profession in our life and economy has been inaugurated this year as a new step in the Associated Serum Producers' public relations campaign on behalf of the profession. Funds were allotted for the new television series as well as for the continuation of the over-all national campaign currently being conducted through newspapers, farm magazines, radio, and motion pictures.

The television programs, showing the work of veterinarians in animal disease control, public health, research, food inspection, and other fields which contribute to the public welfare, will be prepared with the assistance of leaders in the veterinary school at Iowa State College and in collaboration with WOI-TV, the first educational television station established in this country. It is expected that the films will be available for use on television stations by midyear. The venture is in the nature of a "pilot" project and, if successful, it will be expanded to even broader proportions next year.

Together with the continuation of the usual publicity programs carried on in past years in newspapers, farm magazines, on radio stations, the movie, "Valiant Years," this will be one of the largest public relations campaigns the group has ever conducted in support of the veterinary profession.

Member companies whose contributions underwrite the cost of the public relations campaign include: Allied Laboratories, Inc.; Blue Cross Serum Co.; the Columbus Serum Co.; Corn Belt Laboratories, Inc.; the Corn States Serum Co.; Fort Dodge Laboratories, Inc.; Grain Belt Supply Co.; the Gregory Laboratory, Inc.; Jensen-Salsbury Laboratories, Inc.; Liberty Laboratories; the National Laboratories Corp.; Norden Laboratories; Pitman-Moore Co.; Sioux City Serum Co.; Sioux Falls Serum Co., and the Southwestern Serum Co.



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C.G.P. REINFORCED

. . . Known the world over
as a parenteral treatment
for "milk fever" complex



has proved through years of field use to be the safest, most dependable combined mineral (Ca, P, Mg) and carbohydrate therapy offered the veterinary profession. . . . In particularly troublesome cases, when the causative deficiency factors are obscure or indefinite reach for C.G.P. Reinforced.

INDICATIONS: parturient paresis, acetonemia, grass tetany etc.

Supplied in: 12-500cc. bottles.

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KANSAS CITY, MISSOURI

Swine Erysipelas Control

The first thought—

Lockhart



The name *Lockhart* is to Anti-Swine Erysipelas Serum as Cadillac is to the automobile — America's finest.

Now Erysipelothrix Rhusiopathiae Vaccine Desiccated as the companion product.

Liquid vaccine is also available for use during the busy vaccination season.

This will be the swine producers' year — high market value hogs — low priced serum.

ASHE LOCKHART, INC.

"Producers of Better Biologicals for Graduate Veterinarians."

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new

DCM

SPECIAL CONCENTRATION

gives 50% higher initial blood calcium levels

Jen-Sal develops new special DCM for use in problem cases

Now Jen-Sal research offers you an entirely new DCM (dextrose, calcium, magnesium) solution that will give you *50% higher initial blood calcium levels!*

Better yet, this new DCM will maintain these higher therapeutic levels *longer* than regular calcium solutions. You will find this new DCM valuable in problem cases when higher calcium concentrations are indicated.

New DCM (Special Concentration) has been subjected to rigid scientific evaluation involving 5168 individual blood level determinations. Its effectiveness has been confirmed in clinical tests by selected practitioners in 12 states!

We suggest you order a trial dozen of new DCM. Same price as standard product. Be sure to indicate the words *Special Concentration* on your order.

Jensen-Salsbury
Laboratories, Inc.
Kansas City, Missouri

leaders in calcium research for 20 years



SO CLEAR YOU CAN READ THROUGH IT!

New DCM (Special Concentration) is crystal clear — see photograph at left. Free flowing, too.



WHY YOU'LL PREFER NEW DCM:

1. DCM (Special Concentration) gives 50% higher initial blood calcium levels safely.
2. New DCM provides optimum levels at $\frac{1}{2}$ cc. per pound body weight—no need to "double the dose" in tough cases.
3. New DCM's pH is practically neutral—greatly reducing shock hazard.
4. No increase in price—thanks to Jen-Sal's newly expanded production facilities.